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ABSTRACT

This report presents existing workforce levels, training programs and career potentials and develops staffing level projections (1976-1982) based on available information for the State of Texas. The study concerns itself with the environmental pollution control areas of air, noise, potable water, pesticides, radiation, solid waste, wastewater, and energy. The format includes workforce profiles, projections, growth and career options for each of the areas investigated. Additional sections of the report outline state legislation and selected post secondary institutions with formal Environmental/Energy programs. A state profile and summary is included for cross-reference. The selected bibliography is appended in the Region VI report. This document is one in a series of 69 which presents information for each of the states, Washington, D.C., Puerto Rico, and the Virgin Islands, and national and regional summaries. (CS)

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A National Environmental/Energy Workforce Assessment

TEXAS

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NATIONAL ENVIRONMENTAL/ENERGY
WORKFORCE ASSESSMENT

for

TEXAS

Conducted by:

NATIONAL FIELD RESEARCH CENTER, INC

Under Grant from:

UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

Grant #T900591010
1977

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National
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INTRODUCTORY NOTE

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PREFACE

The research and development of the NATIONAL ENVIRONMENTAL/ENERGY WORKFORCE ASSESSMENT project was conducted under the aegis of the U.S. Environmental Protection Agency by the National Field Research Center, Inc., Iowa City, Iowa, and the Denver Regional Office. This report is an assessment of the State of Texas and is one of five state reports within the federal Region VI.

The State of Texas Report presents an overview of: the current workforce, projections of workforce requirements (1976-1982), training and certification, and career potential in environmental pollution control and abatement. The environmental areas depicted within this report are: air, noise, pesticides, radiation, potable water, solid waste, waste water, and energy conservation/conversion.

FOREWORD

This state report is a product of Phase I of the NATIONAL ENVIRONMENTAL/ENERGY WORKFORCE ASSESSMENT project in Texas. The information contained within this report was obtained by extensive on-site interviews and research of project related materials. The information retrieval was conducted through representative federal, state, and when time allowed, local agencies. Telephone and written surveys were utilized as a secondary research source.

Data which are not documented herein are representative of the best professional judgements of experts currently working in the field.

This study is designed specifically for use as a reference tool at the federal regional level as well as at the state level. It is anticipated that the people of the State of Texas will be the beneficiaries of this endeavor.

National Environmental Energy Workforce Assessment

Phase I

TEXAS

State Summary

I. AIR

The Clean Air Act of Texas was passed in 1965. The major purpose of the Texas Clean Air Act is to safeguard the air resources of the state from pollution by controlling or abating air pollution and emissions of contaminants. The Act also provided legislative authority for the establishment of a nine member Texas Air Control Board (TACB). Its program staff now numbers 365. The TACB has been designated as the agency with primary responsibility for the protection of Texas air resources.

Statewide staffing estimates include five to six local agencies with approximately 150 air pollution personnel. The number of air personnel in the private sector is estimated to be 250.

Across the state, increases in air personnel are anticipated to occur at an approximate rate of three percent per annum. Career availability in the air quality field should be apparent at the degreed level and above for the next three to five years. Ever increasing technology will require added skills training and unique areas of expertise. Engineers will continue to be in demand but training will need to include the specialized air quality subject matter.

Specific occupational areas which should be available include: radiation monitor, air analyst (air tester), meteorologist, industrial health engineer, and industrial hygienist.

II. NOISE

Currently in Texas there is very little activity in the field of environmental noise control. Texas has not enacted legislation at the state level. There are, however, municipal ordinances in several cities across the state. Currently, these 17 cities have a combined total of 41 municipal noise ordinances.

The Texas Department of Health Resources, Division of Occupational Health and Radiation Control has been designated as the state lead agency for the area of environmental noise control. The Division conducts the occupational health and safety program which has defined responsibilities in the area including the work place environment. No personnel are assigned on a full-time basis to environmental noise control. Approximately 50 to 75 persons are occupationally involved in noise control activities across the state.

Increased regulation and control of noise emission will require the development of particular courses and training programs at the two year level for careers which will supplement the activities of the more highly trained specialists already in the field. Such careers might be broadly termed environmental specialists or technicians. Other more specialized options such as noise technicians should also develop in the near future. There will be the continuing need for university trained scientists and researchers. Systems analysts, attorneys and graduates in business administration will continue to comprise a smaller though important segment of the field.

III. PESTICIDES

The State of Texas has designated the Texas Department of Agriculture (TDA) as the lead agency for the control of pesticides related activities and persons as well as the products themselves. Several other agencies cooperate with the Department in various activities. Included are the Texas Structural Pest Control Board, Texas Department of Health Resources, Texas Water Quality Board, Texas Animal Health Commission and Texas A & M University.

A Coordinating Council has been created by the Department of Agriculture and consists of members of all of the cooperating agencies. This council is responsible for coordinating certification activities and for allocating overlapping areas of responsibility to the appropriate agency.

Overall statewide increases in staffing levels will occur to 1982 at the rate of approximately three percent per annum. Private applicators, which number approximately 212,000,will experience a growth rate which should not exceed one percent per annum.

A number of career options which will necessitate varying technical skill competencies, as well as those which will require more extensive educational programs, will be available to 1982. There will be a need for professional level training in less specialized areas since pest control extends into the areas of water, solid waste and air.

IV. POTABLE WATER

Aquifers underlie in excess of 50% the surface area of Texas. In the past, this water represented the major source of municipal supplies. Today, however, the cities of the state are becoming increasingly dependent upon surface water. The exhaustion of the aquifer water supplies is a major concern to the state.

Texas has approximately 4,466 drinking water supplies, 90% of which are municipal systems. The predominant problems associated with drinking water in Texas are fluorides and nitrates.

The Texas Department of Health Resources, Bureau of Environmental Health, Division of Water Hygiene is designated as the lead agency to protect public drinking water supplies under the Texas Law and Statutes.

As the population and industrial activity increase in Texas, so too will the need for drinking water personnel increase. Texas has indicated intention of assuming primary enforcement responsibility for the Safe Drinking Water Act, P.L. 93-523. The agency to be charged with this responsibility has not as yet been determined. However, it is most probable that the Department of Health Resources, Bureau of Environmental Health, Division of Water Hygiene will be designated as the responsible agency.

Career opportunities will be available in the field of drinking water over the next three to five years. Operating personnel will be in demand as plants are constructed and/or upgraded.

V. RADIATION

Texas was one of the first states to become an "agreement" state with the Atomic Energy Commission, or Nuclear Regulatory Commission (NRC) as it is called today. Under the terms of this agreement, the state licenses byproduct, source, and special nuclear materials. Currently, Texas has a total of 1,338 licenses across the state. The NRC maintains 118 of these, while the state has accomplished 1,220 licensing activities.

Texas conducts an extensive radiation control program. Currently, only five states across the country maintain radiological health personnel which number in excess of the Texas state and local workforce. The primary responsibility for radiation control in Texas has been allocated to the Department of Health Resources, Occupational Health & Radiation Control Division, Radiation Control Branch. It has been estimated that the statewide workforce consists of 16,050 persons in addition to 28 state level personnel. Increases have been projected to approximate a five percent per annum growth rate to 1982.

Career opportunities, as a result of expansion in the radiation control field, are anticipated to be available in the medical, industrial, nuclear, and dental areas. Demand will exist for technically trained people to work as medical and nuclear technicians.

VI. SOLID WASTE

Solid waste management has gained new dimension in Texas during the last few years. Surrounding states regard the Texas solid waste legislation as a model within the field.

Texas has identified approximately 1,200 solid waste sites across the state. An estimated 95% of these sites are public and the remaining 4% are private facilities.

Primary responsibilities for the administration of the Solid Waste Management Act have been delegated to the Texas Department of Health Resources. Surveillance of municipal sites and enforcement of standards are two major activities. This Division is also involved in engineering and geological evaluation and will become extensively involved in the new federal Resource Conservation and Recovery Act.

The total number of people working across the state at solid waste sites has been estimated at 3,153. State level personnel number approximately 59. Historically, solid waste has not been high on the list of environmental concerns in Texas. With the passing of recent state and federal legislation, however, the state anticipates increases in solid waste personnel. Workforce requirements in solid waste will experience increases due to past neglect and increasing needs.

The integration of more advanced technology, along with more stringent regulations and public demand for more efficiently operated sites, indicates good career potential in the solid waste management field.

VII. WASTEWATER

Substantial improvements have taken place across Texas in the areas of water pollution. But problems do exist. Agricultural wastes constitute one of the most serious threats to the waters of Texas. The manifestations of agricultural wastes include mineralization return flows, animal and poultry wastes, pesticide and herbicide laden runoff, crop residue, and silting. A problem which is somewhat unique to Texas and which is now well under control is subsurface or underground waste disposal.

Pursuant to the Texas Disposal Well Act and the Texas Water Code, the Texas Water Quality Board has been designated as the agency with primary responsibility in the area of water pollution control and abatement. The Board, with over 230 staff employees, is responsible for the issuance of permits, holding of public hearings, enforcement, administration of the construction grants program, stream monitoring, and other areas related to statewide water quality management.

Statewide increases should occur within the wastewater workforce. These increases are estimated to approximate three percent per annum to 1982.

Wastewater treatment technology is becoming increasingly more sophisticated. Operators will require intensified training in order to increase skills and knowledges required to operate these plants.

VIII. ENERGY

Texas is a leading energy resource state. Texas has led the nation for the last 40 years in mineral output value and ranks first in output of petroleum (crude), natural gas, natural gas liquids, carbon black, magnesium chloride, magnesium metal, natural graphite, and value of cement and recovered sulphur output. Texas also produces substantial quantities of aluminum metal, metallic sodium, uranium, clays, lime, salt, sodium sulphate, helium and sand and gravel.

The major state agency identified for purposes of this study is the Governor's Energy Advisory Council. The Council was created by executive order in 1974. With the enactment of the Energy Policy Planning Act in 1975, the Council became a state agency.

The major purpose of the Governor's Energy Advisory Council is to formulate state energy policy. Other areas of responsibility are included within the scope of the Council. The Council includes 39 personnel and no firm figures are available at present regarding the total number of personnel statewide.

The legislature must pass on all increases in staff for the Energy Advisory Council. At the present time, the staff is considered to be adequate and no increases or decreases are anticipated.

While workforce projections for the private sector are highly tentative, sources in the field indicate that significant growth may occur in areas involving conservation expertise. Other areas of specialization will also experience growth.

STATE OF TEXAS - SUMMARY

National Environmental/Energy Workforce Assessment
Pollution Control & Abatement Personnel
Projected Workforce Requirements (1976-1981)
(estimated)

Environmental Area	1976	1977	1978	1979	1980	1981	%/annum growth (average)
AIR	765	786	807	829	853	877	3%
NOISE[1]	68	70	72	74	76	78	3%
PESTICIDES[2]	16,607	17,117	17,480	17,836	17,842	18,201	2%
POTABLE WATER	7,451	7,703	8,126	8,550	8,979	9,426	5%
RADIATION[3]	28	29	30	31	32	33	3%
SOLID WASTE	3,277	3,519	3,790	4,085	4,395	4,730	8%
WASTEWATER	14,397	14,397	15,130	15,881	16,828	16,834	3%
ENERGY	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TOTALS	42,593	43,621	45,435	47,286	49,005	50,179	5%

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[1] Does not include growth for state personnel.

[2] Does not include private applicators.

[3] Does not include more than 16,000 people involved in radioactive materials usage.

EDUCATION

Approximately 10% of the public and private post secondary educational institutions in Texas offer environmentally related courses and/or degree programs. Information was not as readily available regarding community or junior colleges in the state.

East Texas State University at Commerce offers Bachelor's and Master's degrees in Environmental Studies through the Department of Earth Sciences. Lamar University at Beaumont conducts several environmental/energy programs which offer a Bachelor of Science degree. Master's and Doctor's degrees are available in Environmental Science and Environmental Management from the University of Texas, while Sam Houston State University offers a B.S., M.A., and M.Ed. in Environmental Science.

The Stephen F. Austin University conducts a Bachelor level degree program in Environmental Science and Texas A & M University offers an environmental program which leads to a Bachelor of Science degree.

Of the 36 private senior colleges and universities in Texas, four have been identified as currently maintaining environmental/energy related programs. William Marsh Rice University offers the following degrees: B.A., B.S., M.E.S.E., M.S., and Ph.D. through the Department of Environmental Science and Engineering. The Department of Mechanical Engineering at Southern Methodist University offers post baccalaureate degrees in environmental engineering which include the M.S. and the Ph.D.

LEGISLATION

The environmental/energy legislation for Texas was obtained by request from various agency personnel and through various library references. Summaries of the legislation deemed most relevant to the eight subject areas of the workforce assessment were prepared, and are included in the respective state reports. The following list of laws represents virtually all environmental legislation for the state. Only certain of the following laws were summarized; the list is presented to show, by title, the kinds of laws which have been enacted.

Texas Clean Air Act

Pesticide Control Act

Herbicide Law

Texas Sanitation and Health Protection Law

Radiation Control Act

County Solid Waste Control Act

Solid Waste Disposal Act

Refuse Dumping Law

Disposal Well Act

Oil and Hazardous Substances Spill Prevention and Control Act

Texas Water Quality Act

National Environmental Energy Workforce Assessment

Phase I

TEXAS

State Report

STATE PROFILE

Texas, "The Lone Star State," ranks second in the nation in land mass with 267,339 square miles. The land rises gradually from east to west in a succession of broad and marked terraced slopes running parallel with the Gulf Coast. The coastal plain is lined, almost throughout its length, by lagoons cut off from the sea by long, narrow sand islands. The west and southwest is bounded by plateau regions. South of the Panhandle, the North Central plains are rugged due to extensive erosion.

The climate varies from hot, sub-humid characterized by dry winters in the lower Rio Grande Valley, to cold semiarid in the North Panhandle plains region.

The 1970 census reported a population of 11,199,730, a growth of 16.9% from 1960. The population density average is 42.7 people per square mile. Cities of Texas include Houston which is a major port and manufacturing city and has the largest population. Dallas is the cotton center and is a city characterized by manufacturing, financial and commercial enterprises. San Antonio is a shipping center for oil and agricultural products, while Fort Worth is an agricultural marketing center. Austin is the capital of Texas and home of the University of Texas. Over 430,000 students are presently enrolled in universities and colleges of the state.

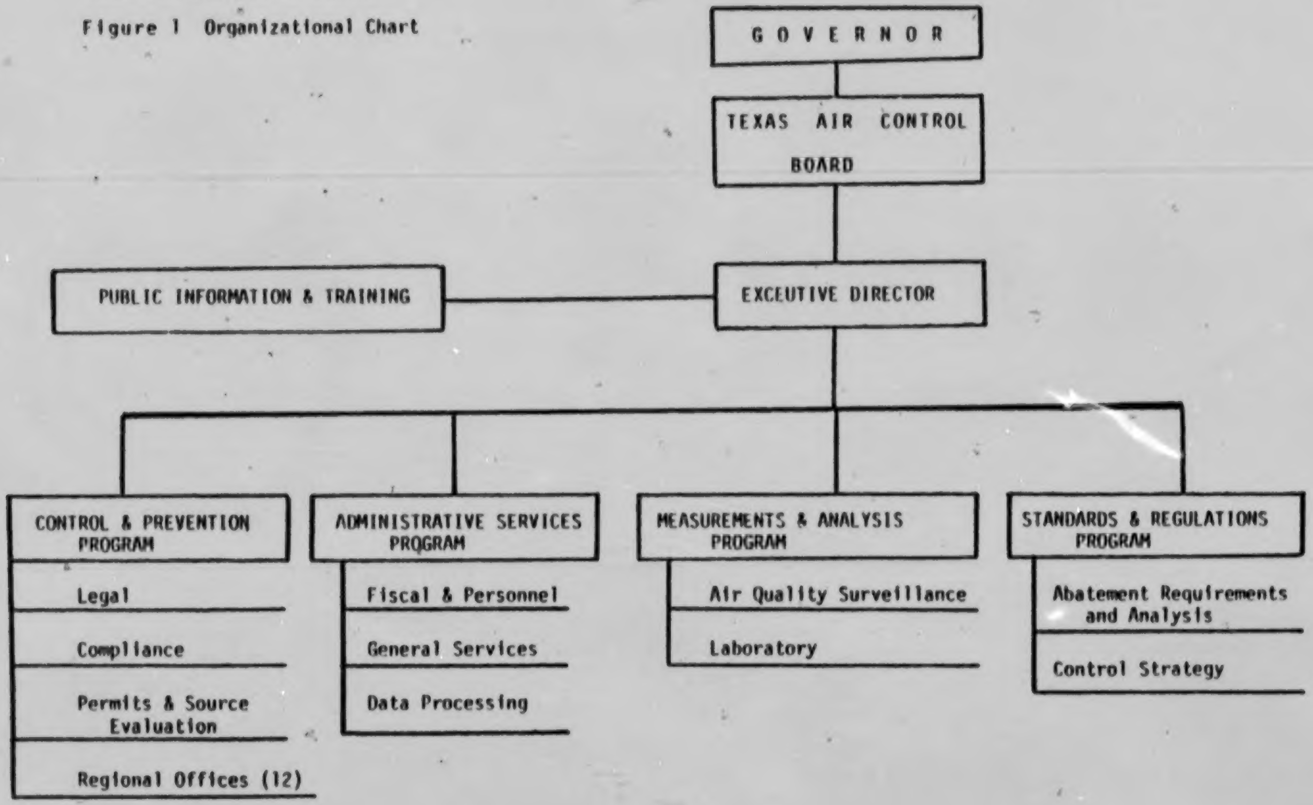
Texas ranked third among states in cash receipts from farming in the early 1970s. The total number of farms in 1970 was 187,000, including more than 145,000,000 acres. The principal commodities are cattle, sorghum grain, cotton lint, and dairy products while the major crops include cotton, rice, and hay.

TEXAS POLLUTION CONTROL AND ABATEMENT AGENCIES

In Texas, the duties and responsibilities for environmental pollution control and abatement programs are divided among several state lead agencies. Responsibility for the air quality program is allocated to the Texas Air Control Board. Pesticides programs and responsibilities are divided among: Texas Department of Health Resources, Texas Water Quality Board, Texas Animal Health Commission, Texas Pest Control Board, and, the Texas Department of Agriculture which is the state lead agency. Radiation and noise programs are administered by the Occupational Health and Radiation Control Division of the Bureau of Environmental Health, Department of Health Resources. Solid waste programs are allocated to the Texas Water Quality Board and the Solid Waste Division, Bureau of Environmental Health, the Texas Department of Health Resources. Waste water and potable water responsibilities are shared by the Texas Water Quality Board and the Department of Health Resources. Organizational charts may be seen on the following pages.

TEXAS AIR CONTROL BOARD

Figure 1 Organizational Chart


GOVERNOR
TEXAS AIR CONTROL BOARD
PUBLIC INFORMATION & TRAINING
EXCEUTIVE DIRECTOR
CONTROL & PREVENTION PROGRAM
Legal
Compliance
Permits & Source Evaluation
Regional Offices (12)
ADMINISTRATIVE SERVICES PROGRAM
Fiscal & Personnel
General Services
Data Processing
MEASUREMENTS & ANALYSIS PROGRAM
Air Quality Surveillance
Laboratory
STANDARDS & REGULATIONS PROGRAM
Abatement Requirements and Analysis
Control Strategy

TEXAS DEPARTMENT OF HEALTH RESOURCES

Figure 2 Organizational Chart

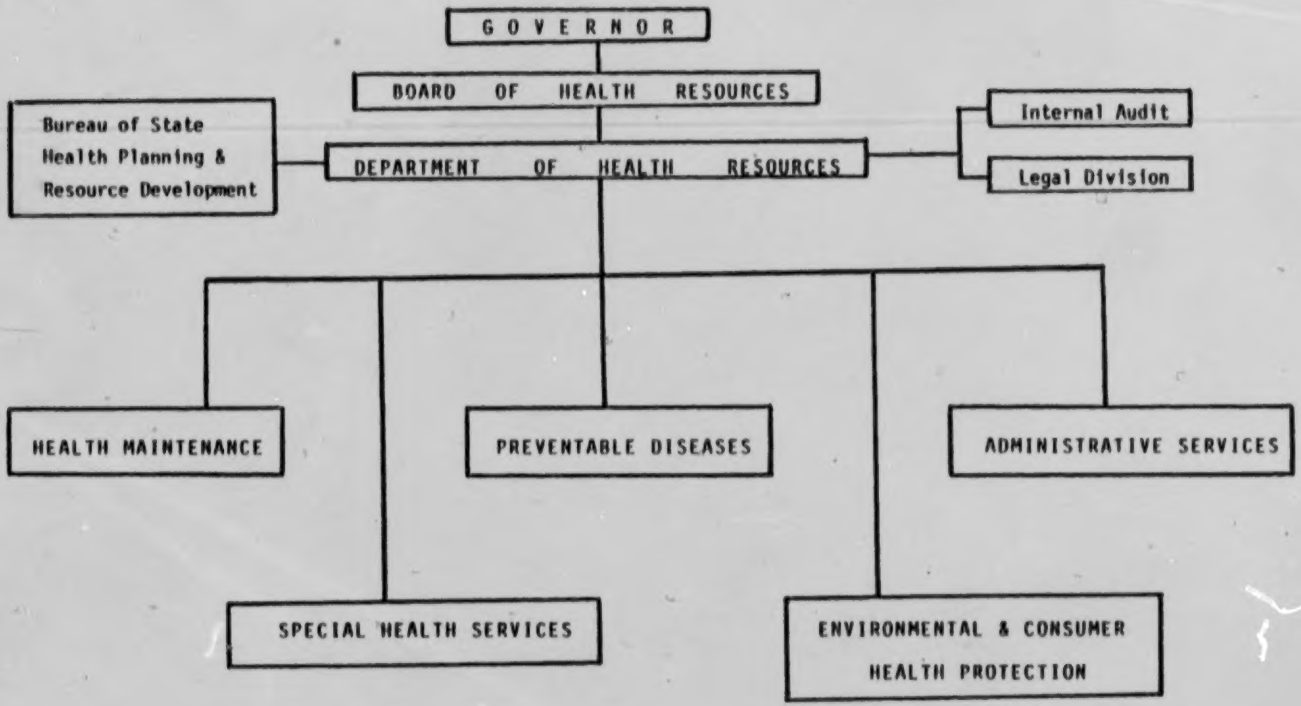
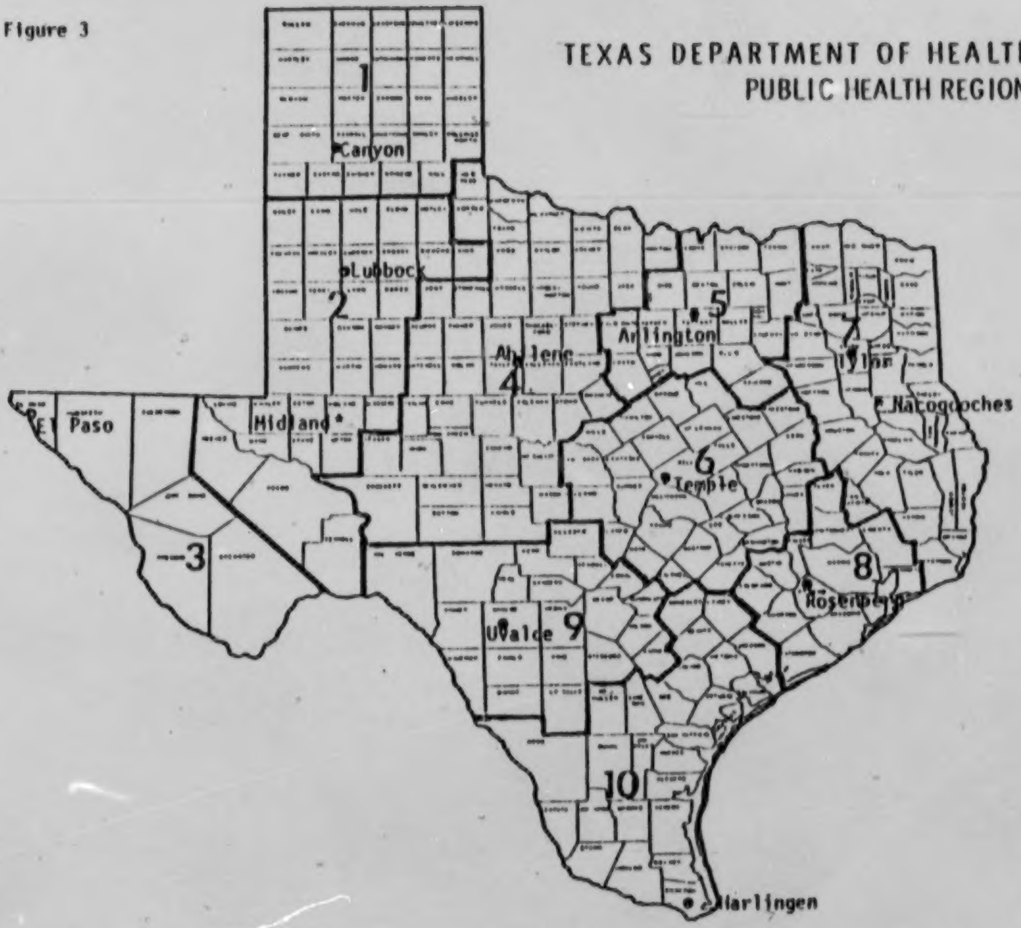

GOVERNOR
BOARD OF HEALTH RESOURCES
Bureau of State Health Planning & Resource Development
DEPARTMENT OF HEALTH RESOURCES
Internal Audit
Legal Division
HEALTH MAINTENANCE
PREVENTABLE DISEASES
ADMINISTRATIVE SERVICES
SPECIAL HEALTH SERVICES
ENVIRONMENTAL & CONSUMER HEALTH PROTECTION

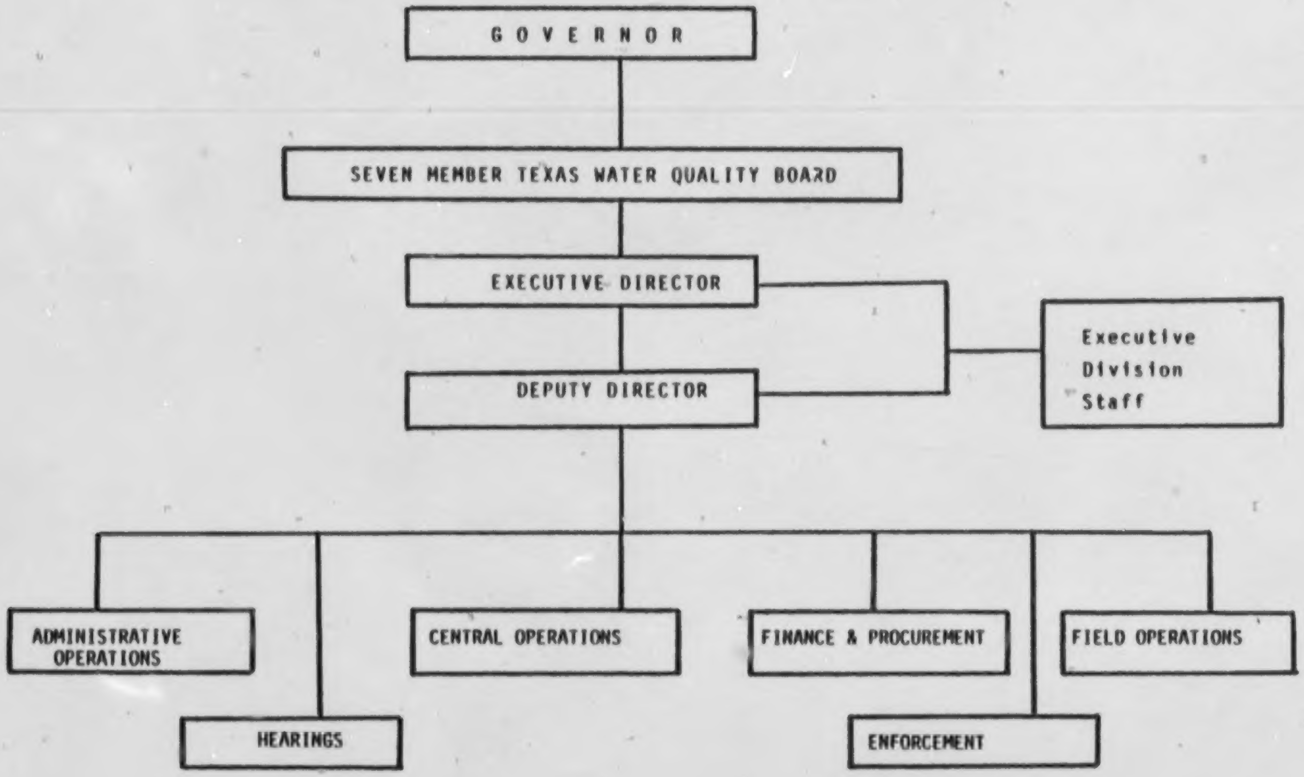
Figure 3

TEXAS DEPARTMENT OF HEALTH RESOURCES
PUBLIC HEALTH REGIONS


1
Canyon
2
Lubbock
3
El Paso
Midland
4
Abilene
5
Arlington
6
Temple
7
Tyler
Nacogdoches
8
Rosenberg
9
Uvalde
10
Harlingen

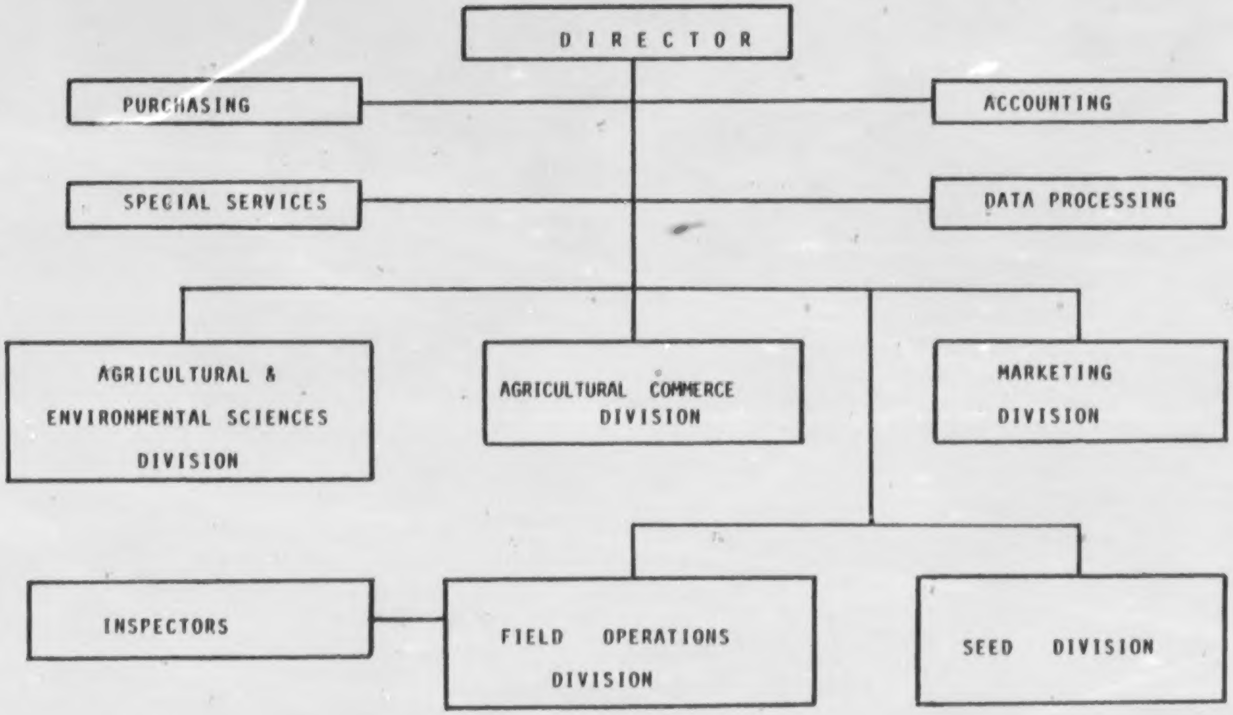
TEXAS WATER QUALITY BOARD

Figure 4 Organizational Chart


GOVERNOR
SEVEN MEMBER TEXAS WATER QUALITY BOARD
EXECUTIVE DIRECTOR
DEPUTY DIRECTOR
Executive Division Staff
ADMINISTRATIVE OPERATIONS
HEARINGS
CENTRAL OPERATIONS
FINANCE & PROCUREMENT
ENFORCEMENT
FIELD OPERATIONS

TEXAS DEPARTMENT OF AGRICULTURE

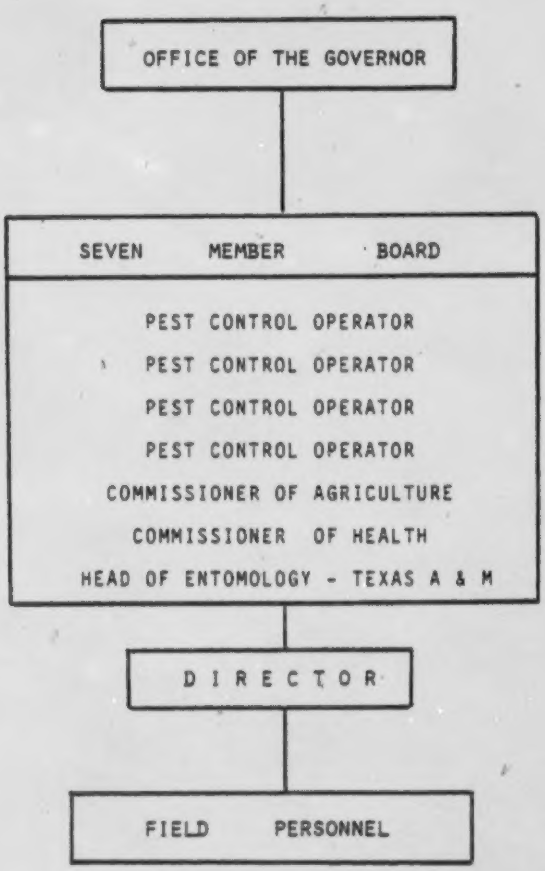
Figure 5 ORGANIZATIONAL CHART


DIRECTOR
PURCHASING
ACCOUNTING
SPECIAL SERVICES
DATA PROCESSING
AGRICULTURAL & ENVIRONMENTAL SCIENCES DIVISION
AGRICULTURAL COMMERCE DIVISION
MARKETING DIVISION
INSPECTORS
FIELD OPERATIONS DIVISION
SEED DIVISION

TEXAS PEST CONTROL BOARD

ORGANIZATIONAL CHART

Figure 6.


OFFICE OF THE GOVERNOR
SEVEN MEMBER BOARD
PEST CONTROL OPERATOR
PEST CONTROL OPERATOR
PEST CONTROL OPERATOR
PEST CONTROL OPERATOR
COMMISSIONER OF AGRICULTURE
COMMISSIONER OF HEALTH
HEAD OF ENTOMOLOGY - TEXAS A & M
DIRECTOR
FIELD PERSONNEL

Pollution Control and Abatement Programs

I. AIR

A. Introduction

The Clean Air Act of Texas was passed in 1965 and provided legislative authority for the establishment of a nine member Texas Air Control Board. The Board is composed of the following:

- ° an engineer;
- ° a licensed physician;
- ° an industrial representative;
- ° a municipal government representative;
- ° an agricultural engineer; and,
- ° four members of the general public.

Until 1973 the Texas State Department of Health provided staff support to the Board. In 1973, however, the Texas Air Control Board and staff became a separate state agency.

The major purpose of the Texas Clean Air Act is to safeguard the air resources of the state from pollution by controlling or abating air pollution and emissions of contaminants. The table below outlines a brief history of air quality control in Texas.

TABLE I

STATE OF TEXAS

History of Air Quality Activities
1956 - 1976

YEAR	ACTIVITY
1956	Air Sampling initiated by Texas State Department of Health, Division of Occupational Health and Radiation Control.

TABLE I

(continued)

YEAR	ACTIVITY
1965	Clean Air Act of Texas passed; Texas Air Control Board established.
1967	Federal Clean Air Act of 1963 amended to provide funding for state and local programs; first Texas Air Control Board regulations adopted.
1968 - 1972	Texas Air Control Board staff expanded from 32 to 220.
1973	Staff of Texas Air Control Board removed from Texas State Department of Health and organized as a separate state agency.
1974	Present Texas Air Control Board organized into three major programs.
1976	Establishment of a fourth program of Texas Air Control Board without increased agency funding or personnel requirements.

SOURCE: Texas Air Control Board

The State of Texas has established some major air pollution control and abatement objectives. They include the following:

- The protection of the health of the citizens from harmful effects of air pollution.
- The insurance that present, as well as potential, air pollution sources control emissions by the most effective abatement methods.
- Education of the citizenry as to current problems and solutions.

As of June 1976, the state was projecting an approximated 76% increase in air quality resource requirements (manpower and dollars) for fiscal year 1977, from fiscal year 1976. There are 1,135 major facilities capable of emitting over 100 tons of pollutant each year, currently identified within the state. As of June, 1976 it was reported that 1,046 were in compliance, 52 in violation, and 37 unknown. Within the fiscal year 1976, a total of 1,101 investigations of compliance status were conducted. Of these investigations 98% were completed in the field and two percent were as a result of written inquiries.

B. Workforce Profile

The primary responsibility for the protection of Texas air resources has been allocated to the Texas Air Control Board (TACB). This responsibility has been divided into four program components which include the following:

° Control and Prevention Program;

° Administrative Services Program;

° Measurements and Analysis Program; and,

° Standards and Regulations Program.

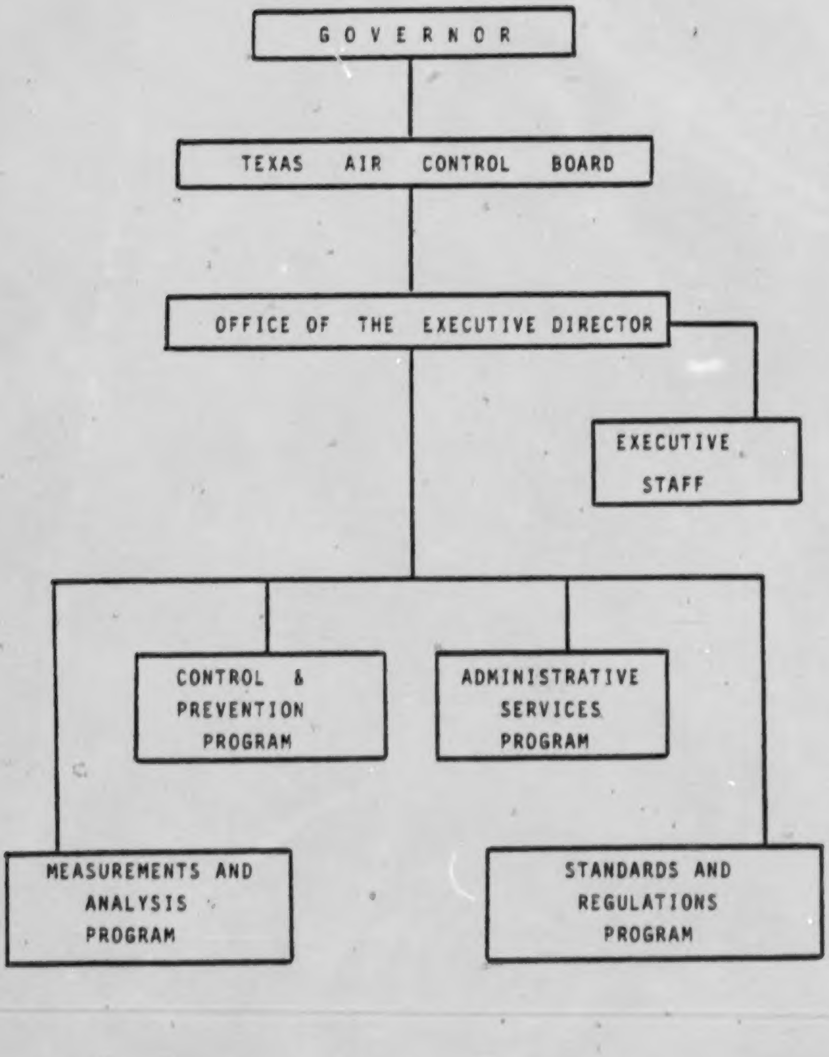
In addition the TACB maintains a Public Information and Training staff. Organizational charts, specific to the staff, are presented in the following pages.

The Control and Prevention Program is responsible for the implementation of rules, regulations, orders and policies as set forth by the Board. The Program is divided into four major areas of responsibility called Divisions:

° Regional Operations Division;

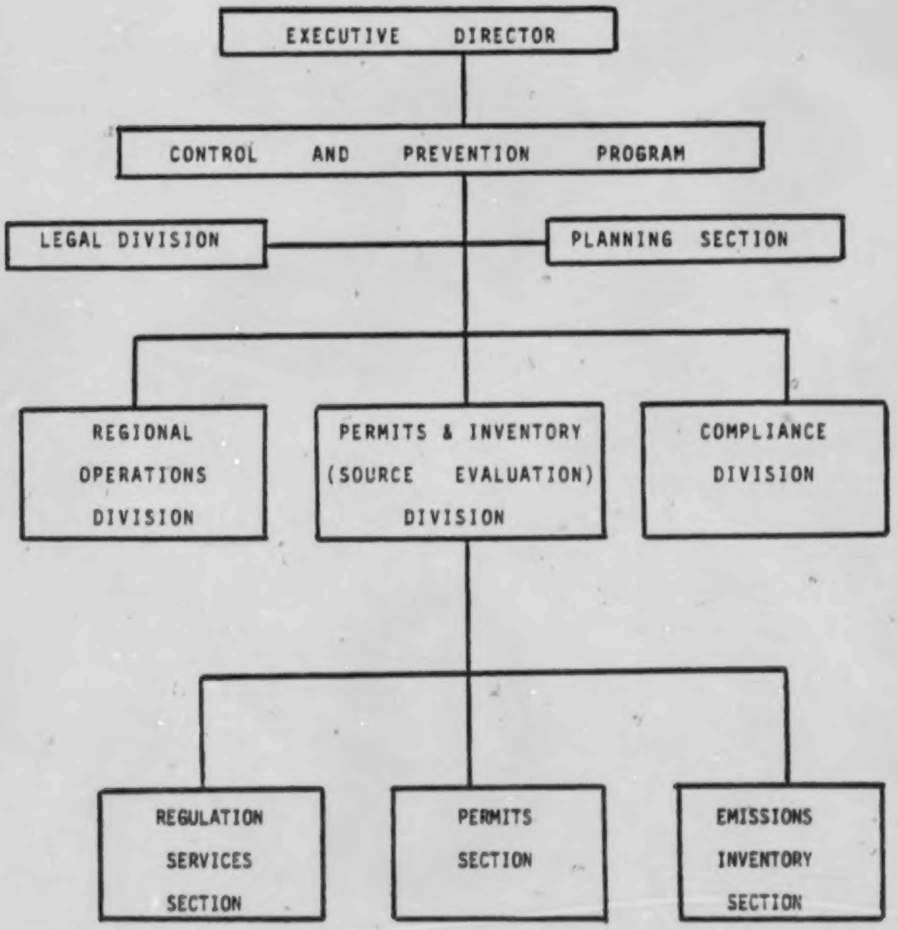
TEXAS AIR CONTROL BOARD

ORGANIZATIONAL CHART
Figure 7


GOVERNOR
TEXAS AIR CONTROL BOARD
OFFICE OF THE EXECUTIVE DIRECTOR
EXECUTIVE STAFF
CONTROL & PREVENTION PROGRAM
ADMINISTRATIVE SERVICES PROGRAM
MEASUREMENTS AND ANALYSIS PROGRAM
STANDARDS AND REGULATIONS PROGRAM

TEXAS AIR CONTROL BOARD

Figure 5 CONTROL & PREVENTION PROGRAM
ORGANIZATIONAL CHART


EXECUTIVE DIRECTOR
CONTROL AND PREVENTION PROGRAM
LEGAL DIVISION
PLANNING SECTION
REGIONAL OPERATIONS DIVISION
PERMITS & INVENTORY (SOURCE EVALUATION) DIVISION
COMPLIANCE DIVISION
REGULATION SERVICES SECTION
PERMITS SECTION
EMISSIONS INVENTORY SECTION

- Compliance Division;
- Permits & Inventory Division; and,
- Legal Division.

The 1963 Federal Clean Air Act identified 247 Air Quality Control Regions (AQCR) in the United States. In Texas 12 AQCR's have been designated. The Texas Air Control Board (TACB) established an office in each region in order to increase understanding of the air pollution problems peculiar to each region. The Regional Operations Division is composed of these personnel, located in the regional offices, as well as the central office staff. The Division is equipped, organized and staffed to accomplish the following:

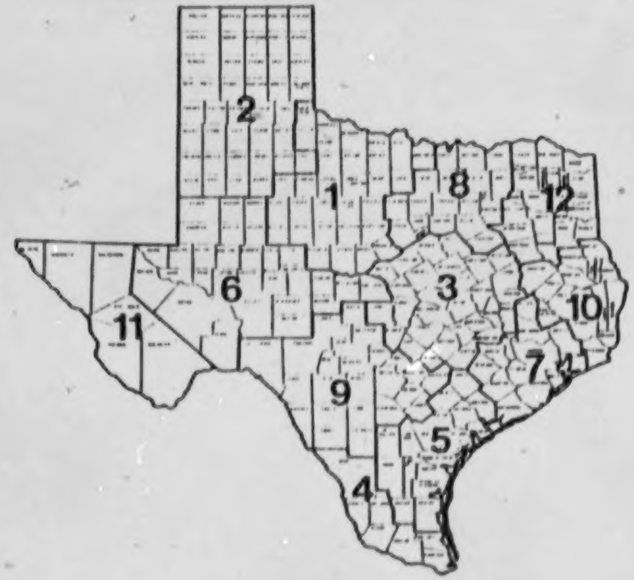
- Monitor compliance by means of a source surveillance system;
- Compile and prepare source data for source surveillance system;
- Investigate all citizen complaints;
- Operate the 16 air quality continuous monitoring stations;
- Operate Haze and Smog Evaluation (HASE) state in Houston;
- Perform field maintenance for Texas Air Sampling Network;
- Conduct air sampling;
- Investigate, evaluate and provide recommendations to the Permits Division on construction and operating permit applications;
- Provide assistance to local air pollution programs; and,
- Educate and inform the public.

The Compliance Division represents the major center for enforcement activities within the Texas Air Quality Board. The chief function of this Division is to direct compliance activities of the state's sources

STATE OF TEXAS

Figure 9 AIR QUALITY CONTROL REGIONS [AQCR]
SOURCE: TEXAS AIR CONTROL BOARD (TACB)

AIR QUALITY CONTROL REGIONS



1. Abilene—Wichita Falls
2. Amarillo—Lubbock
3. Austin—Waco
4. Brownsville—Laredo—Harlingen
5. Corpus Christi—Victoria
6. Midland—Odessa—San Angelo
7. Houston—Galveston—Baytown
8. Dallas—Fort Worth
9. San Antonio

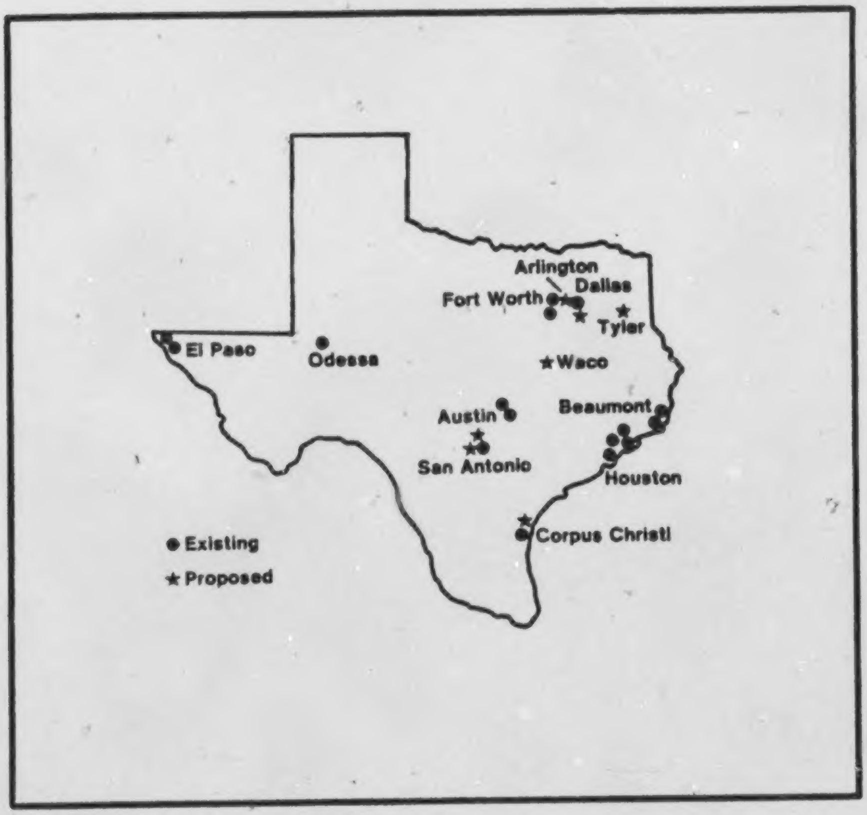
☐ 10. S. Louisiana—S.E. Texas—Beaumont
☐ 11. El Paso—Las Cruces—Alamogordo
☐ 12. Shreveport—Texarkana—Tyler

☐ Interstate Regions
Cities where regional office located is underlined

TEXAS AIR CONTROL BOARD

ATMOSPHERIC MONITORING STATIONS

Figure 10


Arlington
Dallas
Fort Worth
Tyler
El Paso
Odessa
Waco
Beaumont
Austin
San Antonio
Houston
Corpus Christi
● Existing
★ Proposed

As of June, 1976, there were 16 atmospheric monitoring stations located across the State of Texas in the major urban areas. By May, 1977, seven more are scheduled.

SOURCE: TEXAS AIR CONTROL BOARD (TACB)

of air contaminants. Enforcement is conducted through program components which include rules and regulations, increased technical staff support, and permits. This Division also monitors and investigates complaints generated by the public. Approximately 1,300 complaints are processed per year by the Division, usually at the regional level.

The Permits and Inventory (or Source Evaluation) Division is composed of three sections: Permits Section, Regulation Services Section, and Emissions Inventory Section. The Permits Section of the Division evaluates and processes all applications for permits to construct and/or to operate. The Regulation Services Section develops new regulations for controlling air pollution, as well as to propose revisions of existing ones. The Emissions Inventory Section assimilates emissions data from every major industry in Texas.

The Legal Division of the Control and Prevention Program has responsibility for all legal matters. These activities include: close coordination with the Office of the Attorney General, reviewing contracts, assisting in preparation of rules and regulations, and prosecution of enforcement cases in conjunction with the Attorney General.

In addition to the four major Divisions of the Control & Prevention Program, a Planning Section is responsible for maintaining the State Implementation Plan (SIP). Air Quality projections to 1985 for the metropolitan areas of the state designated as Air Quality Maintenance Areas (AQMA), are conducted and assembled by this Section. This Section also includes the major review and analysis staff for activities related to Environmental Impact Statements (EIS).

The Administrative Services Program is closely aligned with the Office of the Executive Director. The Program is composed of three activity components which are referred to as Sections rather than Divisions. These components include: Fiscal and Personnel Section, Data Processing Section, and General Services Section. Responsibilities of these Sections are self-explanatory with the exception of the General Services Section which includes: graphics services including reproduction, vehicle scheduling and maintenance, postal services, library, and building maintenance.

This Program coordinates areas of responsibility with the Public Information Section, Coördination Section and Training Section of the Office of the Executive Director.

The Measurements and Analysis Program is responsible for statewide determination of ambient air pollutant concentrations. This program is the major area of pollutant identification, measurement, diffusion and distribution.

The Program is composed of two Sections: the Air Quality Evaluation (Surveillance) Division and the Laboratory Division.

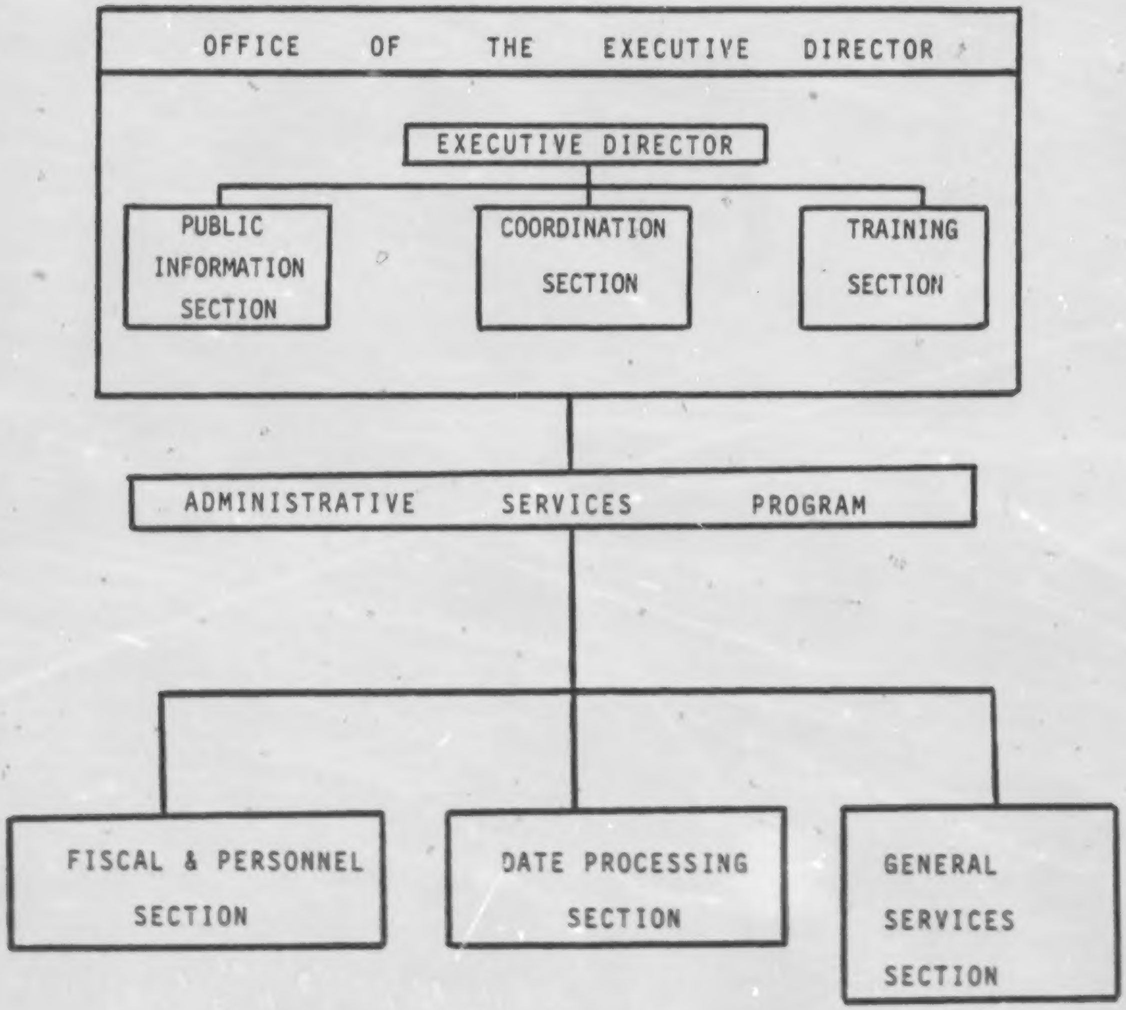
The Air Quality Evaluation Division conducts extensive activities in surveillance and evaluation. These areas of endeavor include:

- Detection and control of air pollution emergencies;
- Verification of compliance schedules;
- Transportation regulation and land use control;
- Evaluation of air pollution effects;
- Epidemiology surveys;

TEXAS AIR CONTROL BOARD

ADMINISTRATIVE SERVICES PROGRAM

Figure 11 ORGANIZATIONAL CHART

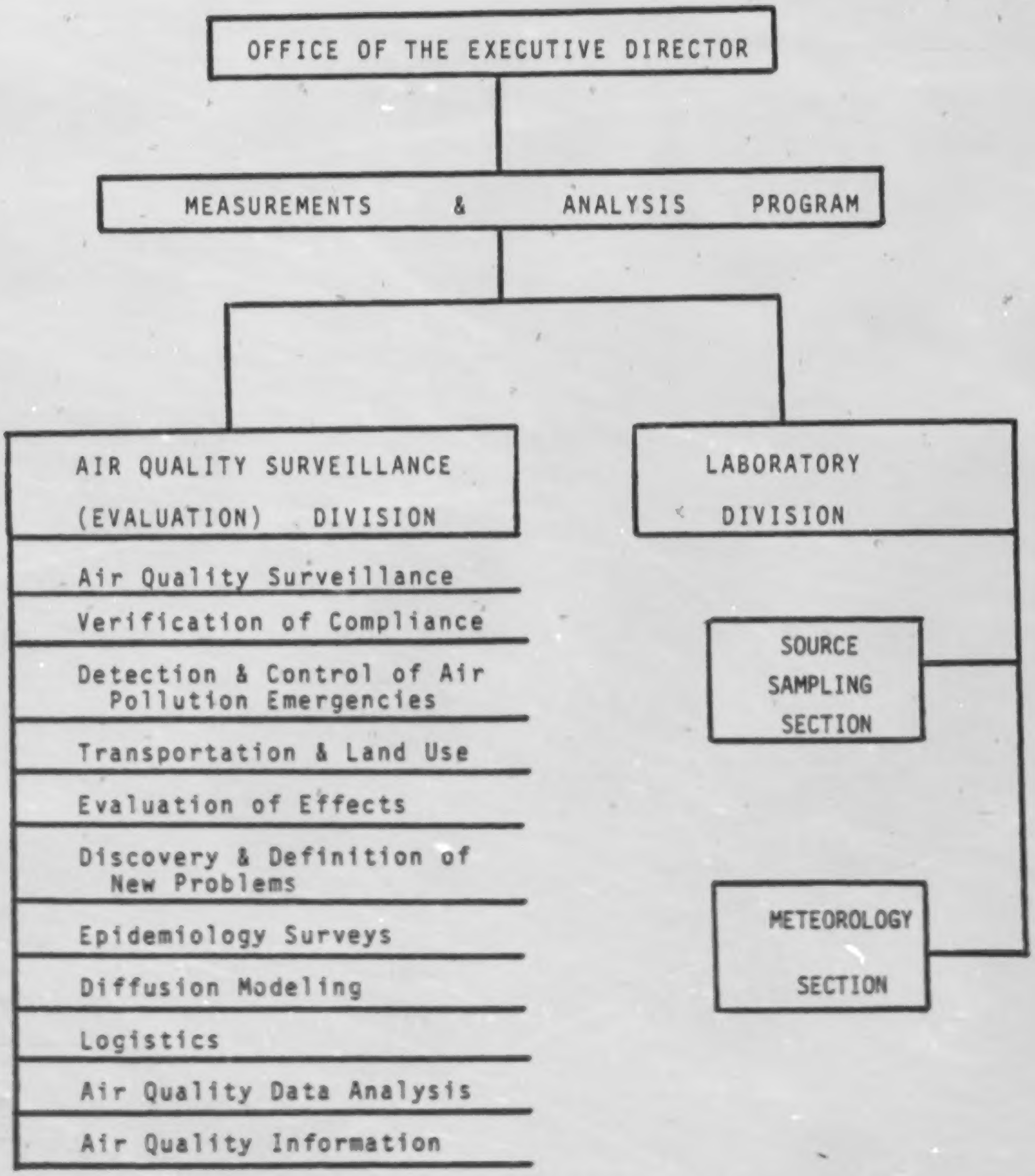

OFFICE OF THE EXECUTIVE DIRECTOR
EXECUTIVE DIRECTOR
PUBLIC INFORMATION SECTION
COORDINATION SECTION
TRAINING SECTION
ADMINISTRATIVE SERVICES PROGRAM
FISCAL & PERSONNEL SECTION
DATE PROCESSING SECTION
GENERAL SERVICES SECTION

NOTE: The components of a TACB Program are usually described as Divisions which have Sections as subdivisions. This Program, however, is composed of the three Sections above with no Divisions.

TEXAS AIR CONTROL BOARD

MEASUREMENTS & ANALYSIS PROGRAM

Figure 12 ORGANIZATIONAL CHART


OFFICE OF THE EXECUTIVE DIRECTOR
MEASUREMENTS & ANALYSIS PROGRAM
AIR QUALITY SURVEILLANCE (EVALUATION) DIVISION
Air Quality Surveillance
Verification of Compliance
Detection & Control of Air Pollution Emergencies
Transportation & Land Use
Evaluation of Effects
Discovery & Definition of New Problems
Epidemiology Surveys
Diffusion Modeling
Logistics
Air Quality Data Analysis
Air Quality Information
LABORATORY DIVISION
SOURCE SAMPLING SECTION
METEOROLOGY SECTION

- Discovery and definition of new pollution problems;
- Logistics; and,
- Air Quality data analysis, information and surveillance.

The Laboratory Division conducts analytical activities regarding pollutants and efficiency of control devices. This Division includes the Source Sampling Section and the Meteorology Section.

The Standards and Regulations Program is a new addition as of 1976 to the Texas Air Control Board. This new program will evaluate public health and welfare implications of exposure to air pollutants. This Program has two Division: Abatement Requirements and Analysis Division; and, the Control Strategy Division. The initial program responsibilities include a comprehensive review of the State Implementation Plan (SIP); review and dissemination of public health related information; and, the establishment of procedures to predict changes in air quality resulting from factors such as growth rate.

The present total staff of the Texas Air Control Board is 365. The tables below depict the personnel by Programs.

TABLE II

TEXAS AIR CONTROL BOARD

Office of the Executive Director
Current (1976) Staffing Level

Position	(a)	(b)	1976	%/annum turnover (average)
Executive Director	1	0	1	0%
Deputy Director	3	0	3	0%
Chief	1	0	1	0%
Administrative Technician	5	0	5	N/A

TEXAS AIR CONTROL BOARD

STANDARDS & REGULATIONS PROGRAM

Figure 13 ORGANIZATIONAL CHART

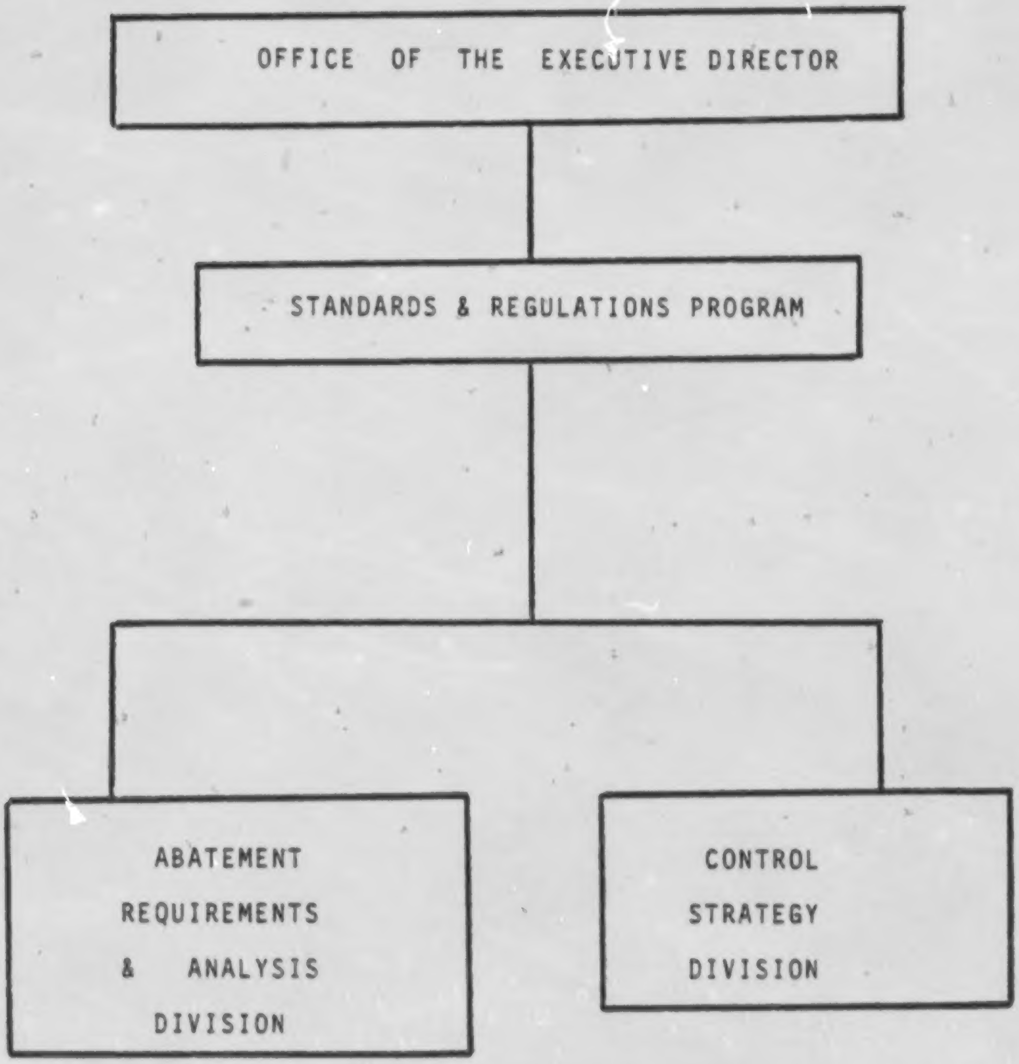

OFFICE OF THE EXECUTIVE DIRECTOR
STANDARDS & REGULATIONS PROGRAM
ABATEMENT REQUIREMENTS & ANALYSIS DIVISION
CONTROL STRATEGY DIVISION

TABLE II

(continued)

Position	(a)	(b)	1976	%/annum turnover (average)
Environmental Health Specialist	0	4	4	5%
Information Specialist	0	2	2	5%
Illustrator	0	1	1	N/A
Secretarial	1	1	2	N/A
Other*	0	0	10	N/A
TOTAL	(11)	(8)	29	N/A

(a) Executive Administration;
(b) Public Information & Training;
* Includes seasonal, hourly, and part-time.

TABLE III

TEXAS AIR CONTROL BOARD

Control & Prevention Program Current (1976) Staffing Level

Position	(a)	(b)	(c)	(d)	1976	%/annum turnover (average)
Program Director	0	1	1	1	3	2%
Chemist	0	0	1	0	1	5%
Hearings Examiner*	0	0	0	5	5	3%
Engineer	29	0	32	0	61	5%
Engineer Technician	30	0	2	1	33	7%
Environmental Health Specialist	37	14	7	0	58	5%
Administrative Technician	1	1	1	0	3	N/A
Secretarial	21	6	7	2	36	N/A
TOTAL	(118)	(22)	(51)	(9)	200	N/A

(a) Regional Operations Division;
(b) Compliance Division;
(c) Permits & Source Inventory (Evaluation) Division;
(d) Legal Division
* Attorney

TABLE IV

TEXAS AIR CONTROL BOARD

Administrative Services Program
Current (1976) Staffing Level

Position	(a)	(b)	(c)	1976	%/annum turnover (average)
Staff Services Officer	1	0	0	1	***
Staff Services Assistant	0	0	1	1	***
Environmental Health Specialist	1	0	0	1	5%
Accountant	5	0	0	5	5%
Personnel Officer	1	0	0	1	5%
Purchasing & Supply Officer	1	0	0	1	***
Accounting Clerk	5	0	1	6	N/A
Personnel Clerk	3	0	0	3	N/A
Property Manager	0	0	1	1	5%
Engineer Technician	1	0	2	3	7%
Duplicator	0	0	1	1	N/A
Stock Clerk	0	0	1	1	N/A
Switchboard Operator	0	0	1	1	N/A
Programmer Analyst	0	1	0	1	5%
Engineer	0	1	0	1	5%
ADP Programmer	0	10	0	10	7%
Systems Analyst	0	2	0	2	5%
ADP Operator	0	4	0	4	N/A
Secretarial	1	2	5	8	N/A
TOTAL	(19)	(20)	(13)	52	N/A

(a) Fiscal & Personnel Section;
(b) Data Processing Section
(c) General Services Section
*** Unavailable.

TABLE V

TEXAS AIR CONTROL BOARD

Measurements & Analysis Program
Current (1976) Staffing Level

Position	(a)	(b)	1976	%/annum turnover (average)
Program Director	1	1	2	3%
Engineer	3	0	3	5%
Environmental Health Specialist	17	1	18	5%
Chemist	2	6	8	5%
Engineering Technician	16	2	18	7%
Office Machine Repair	2	0	2	N/A
Laboratory Technician	1	4	5	7%
Administrative Technician	1	1	2	N/A
Secretarial	4	0	4	N/A
TOTAL	(47)	(15)	62	N/A

(a) Air Quality Surveillance Division;
(b) Laboratory Division.

TABLE VI

TEXAS AIR CONTROL BOARD

Standards & Regulations Program
Current (1976) Staffing Level

Position	(a)	(b)	1976	%/annum turnover (average)
Engineer	5	7	12	5%
Environmental Health Specialist	10	2	12	5%
Engineer Technician	2	0	2	7%
Staff Services Officer	0	1	1	***
Secretarial	3	2	5	N/A
TOTAL	(20)	(12)	32	N/A

(a) Abatement Requirements & Analysis Division;
(b) Control Strategy Division.
*** Unavailable

TABLE VII

TEXAS AIR CONTROL BOARD

Current (1976) Staffing Level
(Synopsis)

Position	(a)	(b)	(c)	(d)	(e)	1976	%/annum turnover (average)
Administrator	5	3	0	2	0	10	3%
Chemist	0	1	0	8	0	9	5%
Attorney	0	5	0	0	0	5	5%
Engineer	0	61	1	3	12	77	5%
Accountant	0	0	5	0	0	5	5%
ADP	0	0	18	0	0	18	***
Engineer Technician	0	33	0	18	2	53	7%
Laboratory Technician	0	0	0	5	0	5	7%
Administrative Technician	5	3	3	2	0	13	N/A
Environmental Health Specialist	4	58	1	18	12	93	5%
Personnel/ Purchasing Officer **	0	0	4	0	0	4	5%
Secretarial	13	36	8	4	5	66	N/A
Other*	2	0	12	2	1	17	N/A
TOTAL	(29)	(200)	(52)	(62)	(32)	375	N/A

* Includes seasonal, hourly; Information Officer; Illustrator; Accounting Clerk; Duplicator
** Includes assistants;
*** Unavailable
(a) Office of the Executive Director;
(b) Control & Prevention Program;
(c) Administrative Services Program;
(d) Measurements & Analysis Program;
(e) Standards & Regulations Program.

Statewide staffing estimates include five to six local agencies with an approximate total number of air pollution personnel of 150.

The number of air personnel in the private sector is estimated to be 250. Industry has increased efforts in air pollution control and abatement, and quantity and quality of personnel has improved. It has been estimated that the number of personnel in the major industries across the state, has increased in some cases by threefold over the last three years.

Information pertaining to the current workforce profile as well as to projections to 1982 was obtained by on-site interview with state personnel. Where estimations were made, it should be noted that these figures are the result of a compilation of the best professional judgements of representatives in the field.

C. Workforce Projections

The air programs of the Texas Air Control Board are well established at present. Further growth is not anticipated. This stabilized condition may be altered after 1979 as the population increases. At this time, however, the Texas Air Control Board is not requesting additional personnel. The turnover rate in the professional sector is approximated at five percent per annum.

The local agencies will experience a five percent per annum growth over the next three to five years. In the private sector, although staffing descriptions are not available, growth in air pollution control and abatement personnel is anticipated. Industrial growth is expected to continue in Texas, and increased regulations and stringent enforcement should affect the number of air personnel in this Sector. The per annum increase in the engineering category in industry should sustain five percent. Supportive and secondary personnel should experience a five to seven percent per annum growth.

D. Training and Certification

Training is extensive in the air quality area in Texas. The U.S. Environmental Protection Agency (EPA) conducts technical courses at their regional offices in Dallas. The Texas Air Control Board has developed an outstanding reputation, not only in Texas, but across the nation. As such, personnel are invited on a regular basis, from the TACB to conduct various training efforts.

The Planning Section, associated with the TACB Control and Prevention Program, organized the Annual Motor Vehicle Emissions Control Conference to investigate current and future programs and plans relative to motor vehicles emissions control.

The Office of the Executive Director includes a Training Section. Until 1974, the major emphasis regarding training, was directed at new employees. However, during the last two years formal courses have been developed and presented to state, local and federal personnel.

The following illustrates the increased interest and emphasis being allocated by the TACB to the area of training:

- Visible Emissions Evaluators Course. Offered once each month, results in Smoke School Certification. This certification is reinstated by means of attendance at visible emissions courses every six months.
- Orientation. Offered once each month unless needed more often; familiarizes new employees with the TACB.

- ° Technical Secretary Series. Designed to assist agency secretaries in areas of technical writing, human relations, arrangement of meetings.
- ° Emergency Care Training. Designed for personnel involved in potentially hazardous activities such as stack sampling.
- ° Video tapes have been produced and are regularly sent to the regional offices.

Training, on the part of the Board, is extensive and well regarded. Undoubtedly the availability of this caliber of air pollution control and abatement training, will affect state and local personnel as well as private industry persons. Increased awareness and understanding of air quality problems and solutions should be the result.

E. Career Potential

Career availability in the air quality field should be apparent at the degreed level and above for the next three to five years. Ever increasing technology will require added skills training and unique areas of expertise. Engineers will continue to be in demand but training will need to include the specialized air quality subject matter.

Specific occupational areas which should be available to 1982 include but are not restricted to: radiation monitor, air analyst (air tester), meteorologist, industrial health engineer, industrial hygienist, automobile mechanic's assistant, automobile mechanic, automobile service mechanic, and smoke reader.

F. Conclusion

Texas leads most Region VI states in air pollution control and abatement efforts. Indeed, Texas programs are regarded as outstanding across the nation. Recently, the work of the Board gained international recognition when representatives from Brazil visited the Texas Air Control Board on a fact-finding mission. Also of international interest, members of the Texas Air Control Board developed a means whereby the Texas Climatological Model and the Texas Episodic Model (air pollution prediction systems) may be transferred and applied to the air pollution problems of Frankfurt, Germany. Texas was accorded the honor of delivering a paper at the North Atlantic Treaty Organization (NATO) in September, 1976.

The Texas Air Control Board, with 365 positions and 12 regional offices has as its main objective the protection of citizens from the adverse effects of air pollution. To this end, the agency has been expanded during recent years. The growth rate, according to Board personnel, will probably level off over the next two to three years. No staff increases, overall, are anticipated for the agency.

From the available information it appears that the professional field in the private sector will experience a five percent per annum growth over the next five years. The positions will be primarily at the degreed or higher levels in most situations, e.g., engineers, chemists, attorneys. Increased regulatory and control activities could diversify career opportunities, however, and there may develop a rather substantial need for individuals trained in short-term technical courses provided by either state or federal agencies. Similar courses might lead to careers as air pollution control aides and technicians, thereby providing the impetus for trainees to complete longer term study in specific academic programs. There is a significant need for air pollution education and research.

At present the air pollution control field is staffed primarily by individuals holding degrees in engineering, meteorology, metallurgy, chemistry, administration and law. However, reductions in funding for research, and in some instances for training, may impair the development of the field. The numbers of graduates in air pollution are not increasing at a time when the need for more personnel has become a national concern. Growth in air pollution control fields in Texas, is anticipated, although many of those entering the field will not have been as specifically trained in air pollution control as employers would prefer. Advances in technologies and changing environmental demands may stimulate growth in the field. Technical careers for those who may not possess the training and skills commensurate with a four-year or advanced degree, will have a significant role in maintaining and improving air quality; but increased degreed level and post graduate training will predominate, as technological advances increase.

II. NOISE

A. Introduction

Currently in Texas there is very little activity in the field of environmental noise control. Texas has not enacted legislation at the state level. There are, however, municipal ordinances in several cities across the state. Currently, these 17 cities have a combined total of 41 municipal noise ordinances. The majority, or 90%, are regulations which do not have acoustical criteria. These regulations are non-quantitative and therefore, are difficult to enforce. The 10% of the total ordinances which do include acoustical criteria are described as performance type regulations. The municipalities currently having noise ordinances may be seen in the table on the following page.

Although there is no state level law regarding environmental noise at present, the federal government has authority to set regulations over certain sources of noise. This authority has been granted in the Noise Control Act of 1972. Currently, these federal regulations affect interstate motor carriers, i.e., trucks and buses, which weigh in excess of 10,000 pounds.

The U.S. Environmental Protection Agency and the National Institute of Municipal Law Offices has drafted a model noise control ordinance. Although this model has been developed for communities with populations of 100,000 or more, it may be retailored for the smaller cities.

TABLE VIII

MUNICIPAL NOISE ORDINANCES - 1976

		ORDINANCE							TOTAL		
COMMUNITY	Aircraft	Building	Construction	Nuisance	Railroad	Vehicle	Rec./Vehicle	Zoning	a	b	
Amarillo				b		a		a	2	1	3
Austin				b					0	1	1
Beaumont			b	b					0	2	2
Corpus Christi				b		b			0	2	2
Dallas				b				a	1	1	2
El Paso				b				b	0	2	2
Fort Worth				b	b	b			0	3	3
Garland				b		b			0	2	2
Houston				b					0	1	1
Irving			b	b		b			0	3	3
Killeen				b		b			0	2	2
Mineral Wells				b		b			0	2	2
Odessa	b		b	b	b	b		a	1	5	6
Saganaw			b	b		b			0	3	3
San Antonia				b					0	1	1
Texarkana			b	b		b			0	3	3
Wichita Falls			b	b		b			0	3	3
TOTAL (a)	0	0	0	0	0	1	0	3	4	0	4
(b)	0	0	6	17	2	10	0	1	0	37	37
	0	0	6	17	2	11	0	4	4	37	41

KEY: a = regulation includes acoustical criteria;
b = regulation does not include acoustical criteria.

SOURCE: Sound and Vibration, December, 1976, Clifford R. Bragdon, Contributing Editor.

B. Workforce Profile

Data for the workforce profile as well as workforce projections were obtained by means of on-site and telephone interviews with personnel in the state environmental control agencies.

The Texas Department of Health Resources, Division of Occupational Health and Radiation Control has been designated as the state lead agency for the area of environmental noise control. The Division conducts the occupational health and safety program which has defined responsibilities in the area which includes the work place environment. However, no personnel are assigned on a full-time basis to environmental noise control.

The following table estimates the current staffing levels allocated to noise control in the Division.

TABLE IX

TEXAS DEPARTMENT OF HEALTH RESOURCES

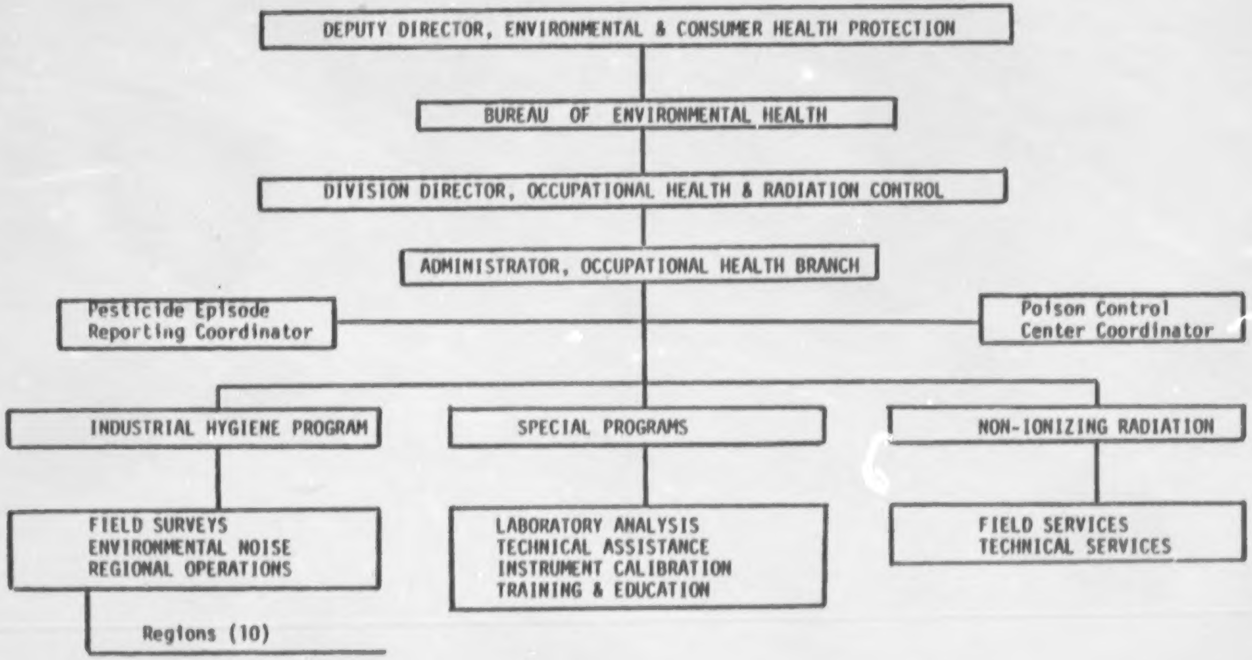
Bureau of Environmental Health
Occupational Health & Radiation Control Division
Occupational Health Bureau
Current (1976) Staffing Level *

Position	1976	%/annum turnover (average)
Engineer Technician	1	6%
Environmental Health Specialist	2	6%
Lab Technician	1	6%
Secretarial	1	N/A
TOTAL	5	N/A

* Part-time.

STATE OF TEXAS - DEPARTMENT OF HEALTH RESOURCES
BUREAU OF ENVIRONMENTAL HEALTH
OCCUPATIONAL HEALTH & RADIATION CONTROL DIVISION - OCCUPATIONAL HEALTH BRANCH

Figure 14 Organizational Chart depicting noise control personnel.


DEPUTY DIRECTOR, ENVIRONMENTAL & CONSUMER HEALTH PROTECTION
BUREAU OF ENVIRONMENTAL HEALTH
DIVISION DIRECTOR, OCCUPATIONAL HEALTH & RADIATION CONTROL
ADMINISTRATOR, OCCUPATIONAL HEALTH BRANCH
Pesticide Episode Reporting Coordinator
Poison Control Center Coordinator
INDUSTRIAL HYGIENE PROGRAM
SPECIAL PROGRAMS
NON-IONIZING RADIATION
FIELD SURVEYS
ENVIRONMENTAL NOISE
REGIONAL OPERATIONS
Regions (10)
LABORATORY ANALYSIS
TECHNICAL ASSISTANCE
INSTRUMENT CALIBRATION
TRAINING & EDUCATION
FIELD SERVICES
TECHNICAL SERVICES

There are approximately 50 to 75 persons occupationally involved in noise control activities across the state. These endeavors include: research projects at universities and colleges; industrial consulting firms; monitoring activities as part of the Texas highway program. For the most part, statewide personnel include: mechanical engineers; physicists; acoustical design experts; and, on a part-time basis, law enforcement officers, not included in the above total.

C. Workforce Projections

The Texas Department of Health Resources, Division of Occupational Health and Radiation Control anticipates no additional staff delegated to noise control for the next two years. Growth will be dependent on noise legislation adopted at the state level. Department officials have stated that staff increases will occur suddenly and in substantial numbers once legislation is enacted.

Statewide personnel will experience an estimated three percent per annum increase over the next three to four years.

The turnover rate will be kept to a minimum and most likely will not exceed three percent.

D. Training and Certification

Academic requirements for personnel involved in noise control programs ordinarily specify a college degree. Areas of expertise include acoustics, mechanical engineering, physics and psychology for research purposes.

Occasional and informational general environmental control courses are offered by community colleges, but few specifically concerned with noise pollution control. None of these courses lead to certification or licensing in the field. A four year or advanced degree in engineering, physics, acoustics or a related scientific discipline remains the primary requisite.

E. Career Potential

Increased regulation and control of noise emission will require the development of particular courses and training programs to the two-year level for careers which will supplement the activities of the more highly trained specialists already in the field. Such careers might be broadly termed environmental specialists or technicians. Other more specialized options such as noise technicians should also develop in the near future. There will be the continuing need for university trained scientists and researchers. Systems analysts, attorneys and graduates in business administration will continue to comprise a smaller though important segment of the field. Careers in both the private and public sectors are expected to grow at a similar pace (three to four percent), although salaries in the private sector will likely be more attractive.

F. Conclusion

In view of the relatively recent development of noise pollution control as a distinct entity in the environmental control spectrum, activities, at least in Texas, are rather limited in scope. The field is staffed by extensively trained and experienced people specializing in scientific areas. As previously pointed out, further regulation and increased public awareness will result in a continued need for these specialists and for program development leading to careers in the less than degreed technical areas. The field is not expected to grow rapidly over the next two years. To meet the mandates of new legislation and the requirements of new technologies as they pertain to noise pollution control, growth will accelerate thereafter. A constant annual rate of about three percent should occur to 1982. Noise control, however, will remain somewhat restricted in terms of staffing levels for the next three to five years.

III. PESTICIDES

A. Introduction

Agricultural activities are a major contributor to the economy of Texas. Minerals development is ranked as the state's leading industry, but agricultural production is such a close second that the two facets are considered, by many, to be equal contributors to the overall economy of the state.

In 1940, the rural community was described as including 33% of the state's population. While this 33% lived on farms, the remaining 67% of the population was located in the more urban areas. Today only 3.5% of the state's populace may be found living on farms. In 1940, there were approximately 418,000 farms in the state. Today, the total number has declined to about 200,000 with an average size of 678 acres. Not surprisingly, but of equal interest, is the increase in value of the land and building from $6,196 in 1940 to $151,871 in 1975.

Substantial changes have occurred within the agricultural industry of Texas. Undoubtedly the most dramatic change has taken the form of mechanized farming. Mechanical devices replaced manual labor.

Agricultural chemicals have played a leading role in these changes across the state. Improved plants and animals managed by increasingly more educated farmers contributed to the overall agricultural picture. Just as improved mechanization, increased breeding stock, higher grade plants and better educated personnel contributed to an improved economic climate in the agricultural sector, so also did certain hazards contribute to the ranchers' problems. Labor problems, dramatic out-migration contributing to the state's urbanization, and, rising financial costs, were major areas of concern for the agricultural community.

Chemicals in the form of pesticides, herbicides, rodenticides, and predacides proliferated. Under the original Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) of 1947, registration of these products was accomplished but only if marketed in interstate commerce. In 1972, the FIFRA was expanded and revised through adoption of amendments known as the Federal Environmental Pesticide Control Act of 1972. Under the amended Act, pesticides had to be classified for "general" or "restricted" use. Eventually the restricted use pesticides may be utilized only by certified applicators. Subsequently, the U.S. Environmental Protection Agency set forth standards for restricted use pesticides. The lead agency within each state is responsible for the eventual training and certification program. In most cases the training is allocated to the state's Extension Service.

The State of Texas has decided that the Indian governing body will develop and be responsible for its own pesticide plan.

B. Workforce Profile

The State of Texas has designated the Texas Department of Agriculture (TDA) as the lead agency for the control of pesticides-related activities and persons as well as the products themselves. Several other agencies cooperate with the Department in various activities and responsibilities. The following table briefly outlines the major contributions on the part of the cooperating agencies. The Department functions and responsibilities are more completely detailed below.

TABLE X

STATE OF TEXAS

Cooperating Agency Responsibilities[1]
Pesticides Control

Agency	Activity/Responsibility
Texas Structural Pest Control Board	Certification of commercial[2] and non-commercial[3] applicators involved in industrial, institutional, structural, health related pest control.
Texas Department of Health Resources	Certification of commercial and non-commercial applicators involved in public health and health related pest control.
Texas Water Quality Board	Certification of commercial and non-commercial applicators involved in aquatic pest control.
Texas Animal Health Commission	Certification of commercial and non-commercial applicators involved in animal pest control.
Texas Agricultural Extension Service (Texas A & M University)	Developed training materials for use with private and commercial applicators in all categories and subcategories.

---

[1] Except Texas Department of Agriculture (TDA);

[2] Commercial Applicator: one who owns or manages a pesticide application business;

[3] Non-commercial Applicator: one who is neither a commercial nor a private applicator.

According to the State of Texas, Plan For Certification of Pesticides Applicators, the Structural Pest Control Board consists of four members from industry appointed by the Governor and three ex officio members representing the Commissioner of Agriculture. The Texas Animal Health Commission consists of nine commissioners appointed by the Governor to protect and maintain animal health. The Texas Department of Health Resources and the Texas Water Quality Board are described throughout other sections of this report.

A Coordinating Council has been created by the Department of Agriculture and consists of members of all of the cooperating agencies. This council is responsible for coordinating certification activities and for allocating overlapping areas of responsibility to the appropriate agency.

The following table illustrates the current workforce involved in pesticides activities through most of the cooperating agencies listed above.

TABLE XI

STATE OF TEXAS

State Personnel Cooperatively Involved
In Pesticides Programs
Current (1976) Staffing Level
(estimated)

Position	(a)	(b)	(c)	(d)	1976	%/annum turnover (average)
Director	1	1	1	0	3	0%
Administrator	1	0	0	1	2	2%
Animal Health Inspector	0	0	0	6	6	**

TABLE XI

(continued)

Position	(a)	(b)	(c)	(d)	1976	%/annum turnover (average)
Agricultural Inspector	6	0	0	0	6	**
Health Program Specialist	0	1	0	0	1	5%
Sanitarian	0	5	0	0	5	5%
Accounting Clerk	0	0	1	0	1	N/A
Hydrologist	0	0	1	0	1	2%
Biologist	0	0	12	0	12	3%
ADP Personnel	0	0	3	0	3	N/A
Veterinarian	0	0	0	1	1	0%
Other*	5	0	3	0	8	**
Secretarial	1	1	2	1	5	N/A
TOTAL	(14)	(8)	(23)	(9)	54	N/A

(a) Texas Structural Pest Control Board;
(b) Texas Department of Health Resources;
(c) Texas Water Quality Board;
(d) Texas Animal Health Commission;
* Mostly Agricultural Extension Service personnel;
** Unavailable.

The Texas Department of Agriculture is the state lead agency and is directed by the Commissioner of Agriculture. All acts such as the Texas Pesticide Control Act are administered by the Department pursuant to authority delegated by the legislature. The Commissioner, after public hearings, adopts rules and regulations which have been promulgated to enforce the laws of the legislature. All of the cooperating agencies report to the Department of Agriculture. The table below details the current workforce allocated to the Department of Agriculture's pesticides program.

TABLE XII

TEXAS DEPARTMENT OF AGRICULTURE

Agricultural & Environmental Sciences Division
Current (1976) Staffing Level

Position	1976	%/annum turnover (average)
Director	1	0%
Assistant Director	1	0%
Entomologist	8	0%
Herbicide Specialist	1	0%
Cotton Insect Specialist	1	**
Inspector	11	5%
Chemist	7	**
Nematologist	1	**
Agronomist	1	**
Secretarial	4	N/A
TOTAL	36	N/A

**unavailable

The following table details the estimated commercial and private pesticides applicator workforce across the State of Texas. The turnover rate has been omitted, but the rate has been described as relatively high (20%), within the commercial (and non-commercial) applicator occupational field. The private applicators depicted below are, for the most part, farmers and ranchers who are working almost exclusively on their own lands. A turnover rate for this category would not be of value herein. It is therefore, described as not applicable.

The following table and the other workforce profile and projection figures were obtained during on-site interviews and telephone conversations. All workforce profiles are the result of a compilation of the best professional judgements of those working across the field.

STATE OF TEXAS

DEPARTMENT OF AGRICULTURE

AGRICULTURAL & ENVIRONMENTAL SCIENCES DIVISION

Figure 15 Organizational Chart

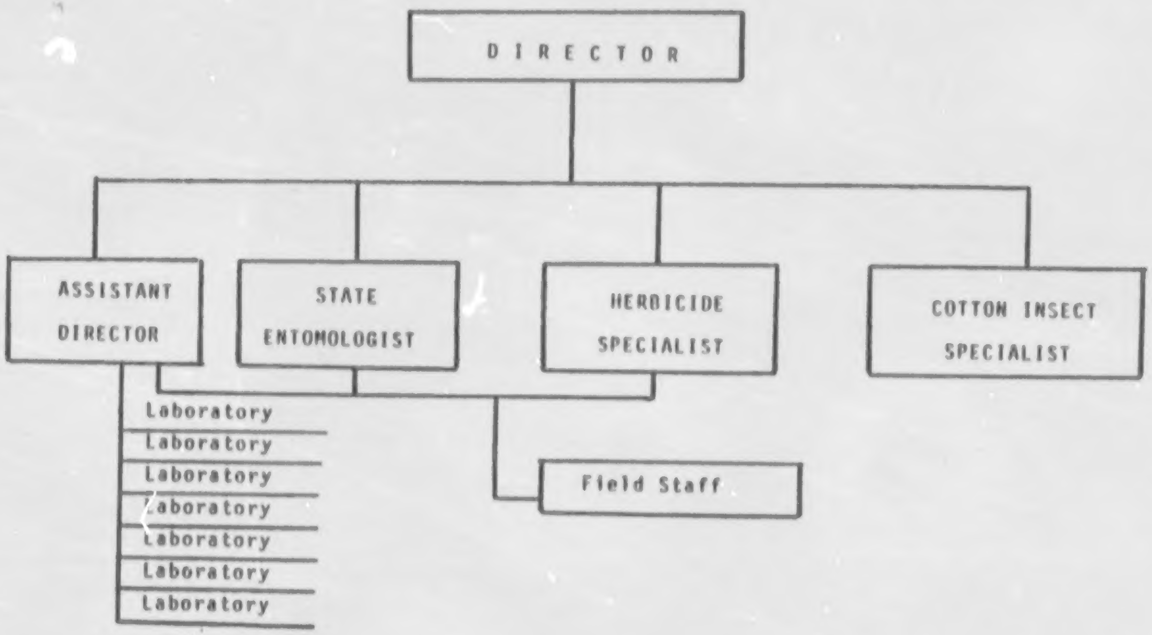

DIRECTOR
ASSISTANT DIRECTOR
STATE ENTOMOLOGIST
HERBICIDE SPECIALIST
COTTON INSECT SPECIALIST
Laboratory
Laboratory
Laboratory
Laboratory
Laboratory
Laboratory
Laboratory
Field Staff

TABLE XIII

STATE OF TEXAS

Pesticides Personnel
Current (1976) Staffing Level
(estimated)

Category			1976
Commercial & Non-Commercial Applicator:			16,517
Agricultural Pest Control		1,800	
Field Crop	1,000		
Fruit & Vegetable	200		
Weed & Brush	250		
Predatory Animal	200		
Farm Storage	100		
Fumigation	50		
Forest Pest Control		125	
Insect & Disease	65		
Weed & Brush	60		
Ornamental & Turf Pest Control		200	
Plant	100		
Greenhouse	50		
Weed	50		
Animal Pest Control		900	
Tick, Louse & Mite	450		
Fly	450		
Aquatic Pest Control		850	
Plant	425		
Animal	425		
Industrial, Institutional, Structural & Health Related Pest Control		6,517	
Pest Control	1,879		
Fumigation	542		
Weed	803		
Termite	1,731		
Lawn & Ornamental	1,562		

TABLE XIII

(continued)

Category			1976
Health Related Pest Control (Including Public Health)		5,000	
Vector	1,000		
Rodent	1,000		
Sanitation	3,000		
Seed Treatment		75	
Right-of-Way Pest Control		250	
Regulatory Pest Control		300	
Demonstration & Research		500	
Private Applicators			212,000
TOTAL			228,517

C. Workforce Projections

Increases in workforce are anticipated across the state during the next three to five years. The table below estimate staffing requirements to 1982 for the composite group of agencies which are currently working cooperatively in the pesticides program with the Department of Agriculture.

TABLE XIV

STATE OF TEXAS

State Personnel Cooperatively Involved
In Pesticides Program
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Director	3	3	3	3	3	3	0%	0%
Administrator	2	2	2	2	2	2	2%	0%

TABLE XIV

(continued)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Animal Health Inspector	6	7	8	9	10	11	**	13%
Agricultural Inspector	6	7	8	9	10	11	**	13%
Health Program Specialist	1	1	2	2	2	2	5%	20%
Sanitarian	5	6	7	8	10	11	5%	17%
Accounting Clerk	1	1	1	1	1	1	N/A	0%
Hydrologist	1	1	1	1	1	1	2%	0%
Biologist	12	12	13	14	14	14	3%	3%
ADP Personnel	3	3	4	5	5	5	N/A	12%
Veterinarian	1	1	1	1	1	1	0%	0%
Other	8	8	10	11	12	13	**	10%
Secretarial	5	6	7	8	9	10	N/A	15%
TOTAL	54	58	67	74	80	85	N/A	9%

** unavailable

The following table depicts the estimated workforce requirements over the next five years for the Department of Agriculture pesticides personnel.

TABLE XV

TEXAS DEPARTMENT OF AGRICULTURE

Agricultural and Environmental Sciences Division
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Director	1	1	1	1	1	1	0%	0%
Assistant Director	1	1	1	1	1	1	0%	0%
Entomologist	8	11	14	14	14	14	0%	13%
Herbicide Specialist	1	1	3	3	3	3	0%	40%

TABLE XV

(continued)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Cotton Insect Specialist	1	1	1	1	1	1	**	0%
Inspector	11	16	25	25	25	25	5%	20%
Chemist	7	7	7	7	7	7	5%	0%
Nematologist	1	1	1	1	1	1	**	0%
Agronomist	1	1	1	1	1	1	**	0%
Secretarial	4	6	6	8	8	8	N/A	17%
TOTAL	36	46	60	62	62	62	N/A	12%

**unavailable

State personnel anticipate an average per annum growth rate of 2% for the commercial and non-commercial applicator category. The private applicators will illustrate a decline in numbers. As has been previously mentioned, the number of persons involved in farming and ranching across the state has been declining over the last 30 years. This trend will, no doubt, continue for various reasons. There is no evidence to support increases within the private applicator category. The following table details the growth anticipated for the commercial applicator category. This table includes the non-commercial applicator, who has been defined as neither commercial nor private applicator.

TABLE XVI

STATE OF TEXAS

Pesticides Applicators Commercial & Non - Commercial Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Commercial & Non-Commercial Applicator	16517	17031	17353	17700	17700	18054	20% *	2%
TOTAL	16517	17013	17353	17700	17700	18054	20%	2%

* estimated

The table below illustrates the projected decrease per annum in private applicators. This table illustrates a one percent per annum decline.

TABLE XVII

STATE OF TEXAS

Private Pesticides Applicators Workforce Projections to 1982 (est.)

1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum decline (average)
212,000	209,880	207,782	205,704	203,647	201,611	N/A	1%
212,000	209,880	207,782	205,704	203,647	201,611	N/A	1%

D. Training and Certification

The pesticides applicator training plan has been prepared by the Texas Agricultural Extension Service, Texas A & M University. The materials for training commercial and private applicators in all categories and subcategories, are being developed by the Extension Service. Under the terms of the plan, the Extension Service will conduct training for all categories and subcategories. After administration of the examination, certification is awarded by the applicable cooperating agency. The following details the cooperating agencies and the specific categories and subcategories over which certification control is designated. The Department of Agriculture (TDA) is responsible for the certification of all categories and subcategories not designated below.

TABLE XVIII

STATE OF TEXAS

Pesticides Certification Authority
Cooperating Agencies Except TDA

AGENCY	CERTIFICATION CATEGORY AND SUBCATEGORY
Texas Structural Pest Control Board	Industrial, Institutional, Structural & Health Related: ° Pest Control ° Termite Control ° Lawn & Ornamental ° Fumigation ° Weed
Texas Department of Health Resources	Health Related Pest Control including: ° Vector Control ° Weed Control ° Sanitation
Texas Water Quality Board	Aquatic Pest Control: ° Plant ° Animal
Texas Animal Health Commission	Animal Pest Control: ° Tick, Louse, Mite ° Fly

The state currently has a licensing program for pest control operators. The State of Texas, Plan for Certification of Pesticide Applicators, indicates that Texas will request that the U.S. Environmental Protection Agency (EPA) accept the present tests and testing procedures. Further, those applicators who have passed the licensing examination would be automatically certified without further testing.

The Texas Department of Agriculture will certify all private applicators. To date, 633 private applicators have been certified. The majority of the training and certification of private applicators remains to be completed.

E. Career Potential

A number of career options which will necessitate varying technical skill competencies, as well as those which will require more extensive educational programs, will be available to 1982. There will be a need for professional level training in less specialized areas since pest control extends into the areas of water, solid waste and air. The following represents a partial listing of available options.

- Pesticide Research
- Pesticide Management
- Equipment Maintenance
- Equipment Design
- Custom Applicator
- Custom Operator
- Entomologist
- Aquatic Biologist
- Horticulturist
- Botanist
- Sanitarian
- Sanitary Engineer
- Environmental Engineer
- Environmental Technologist
- Research Scientist
- Technical Assistant

As might be expected, most professional areas within the field will require considerable training in the sciences. Many of the less than degree level skills could be acquired with shorter vocational technical courses complemented by internships and work-study.

F. Conclusion

Regulation and certification will necessitate the training and education of a great number of people who will be able to deal with future developments in the field. It is difficult to determine specifically what disciplines will offer the greatest career potential as new technology, shifting demographic conditions and regulatory mandates emerge. A career which may well play an important role in pest control management in Texas might be in the area of Integrated Pest Management (IPM). IPM utilizes several methods. Sterilization, pathogens and chemicals, to control specific pest problems are examples. Such a program, as outlined in the Associated Research Corporation (South Miami, Florida) report, Integrated Pest Management (1973), provides viable training alternatives. Many of the previous careers outlined in the career potential section would be congruent with the Pest Management schematic at a variety of levels depending upon the individual's interest. Certainly IPM will not be the solution to the difficulties confronting the field of pesticides and pest control across Texas, but it may be a point from which future planning could begin.

IV. POTABLE WATER

A. Introduction

Aquifers, which are water-bearing strata of permeable rock, sand or gravel, underlie in excess of 50% of the surface area of Texas. In the past, this water represented the major source of municipal supplies. Today, however, the cities of the state are becoming increasingly dependent upon surface water. The exhaustion of the aquifer water supplies is a major concern to the state.

The major aquifers in Texas include: Ogallala Formation, Trinity Sands, Edwards, Carrizo and Wilcox Group, Gulf Coast, and Alluvial and Bolson. The major fresh water aquifers are depicted on the following page. The Ogallalo Formation is the only major source of usable water on the High Plains. Over 50% of the total Texas crop value is produced by irrigation, almost exclusively from the Ogallala Formation. Recharge water is quite limited and depletion of this source is a major threat to agricultural irrigation activities on the High Plains.

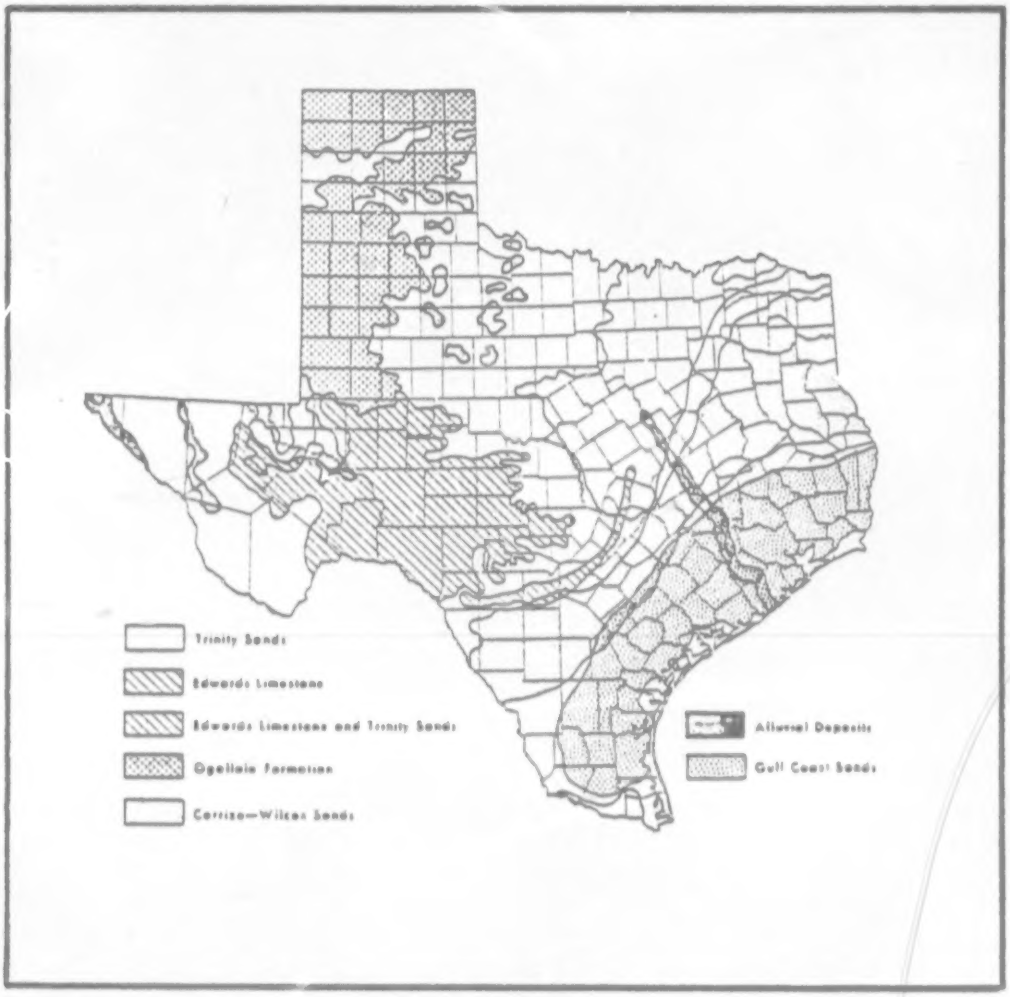
The Trinity, Paluxy and Woodbine Sands extend over large parts of the area depicted on the map. All three of these sands are not present everywhere in the area. These waters are allocated to municipal and industrial uses in North Texas. Larger cities in this area, however, are obtaining increasing quantities of water from reservoirs.

The Edwards or Balcones Fault Zone Aquifer, is approximately 175 miles long and five to 25 miles wide. In December, 1975, after more than 40 years of intensive study, the U.S. Environmental Protection

TEXAS

MAJOR FRESH WATER AQUIFERS

Figure 16


Trinity Sands
Edwards Limestone
Edwards Limestone and Trinity Sands
Ogallala Formation
Carrizo—Wilcox Sands
Alluvial Deposits
Gulf Coast Sands

SOURCE: Texas Almanac 1976-1977, Water Resources page 110. (Texas Water Development Board)

Agency (EPA) determined that contamination of this underground reservoir would create a significant health hazard. Edwards is the sole source of water for approximately one million people, and is vulnerable to contamination through its recharge zone. The EPA decision is the first of this nature in the country.

The decision was predicated on Section 1424(e) of the Safe Drinking Water Act (P.L. 92-523), known as the Gonzales Amendment. As a result of the EPA action, no commitment for federal financial assistance for any project may be entered into which carries the possibility of contamination to the Edwards recharge zone.

The Carrizo Sand and Wilcox Group may also be seen on the map. Wells from these sands are the principal source of water in the southwest part of the area. These sands are also suppliers of substantial quantities of water to wells in northeast and east central Texas.

The Gulf Coast Aquifer supplies moderate to large quantities of water from the Catahoula, Oakville, Lagarto, Golliad, Lissie, Beaumont, and Willis formations which consist of interfingered layers of sand and clay. Large quantities of this water are utilized by Gulf Coast area municipal and industrial users. Surface subsidence is occurring in some coastal areas due to the removal of large quantities of water.

The U.S. Geological Survey has identified 3,700 streams in Texas with a combined length equal to approximately 80,000 miles. Major rivers include: the Rio Grande, Nueces, San Antonio, Guadalupe, Lavaca, Colorado, Brazos, San Jacinto, Trinity, Sabine, Neches, and the famous Red River. In addition, there are many smaller, secondary rivers.

In 1913 Texas had only eight major reservoirs. Today, there are 200 major reservoirs each storing 5,000 acre feet of water or more. There are also at least 815 small watersheds with water retarding structures built by the U.S. Soil Conservation Service.

Texas has approximately 4,466 community type public water supplies, 40% of which are municipal systems. The predominant problems associated with drinking water in Texas are fluorides and nitrates. Approximately 538 systems, serving 250,000 people have excessive fluoride levels. Another 66 systems, serving approximately 35,000 people have drinking water with high levels of nitrates.

B. Workforce Profile

The Texas Department of Health Resources, Bureau of Environmental Health, Division of Water Hygiene is designated as the lead agency to protect public drinking water supplies under the Texas Law and Statutes.

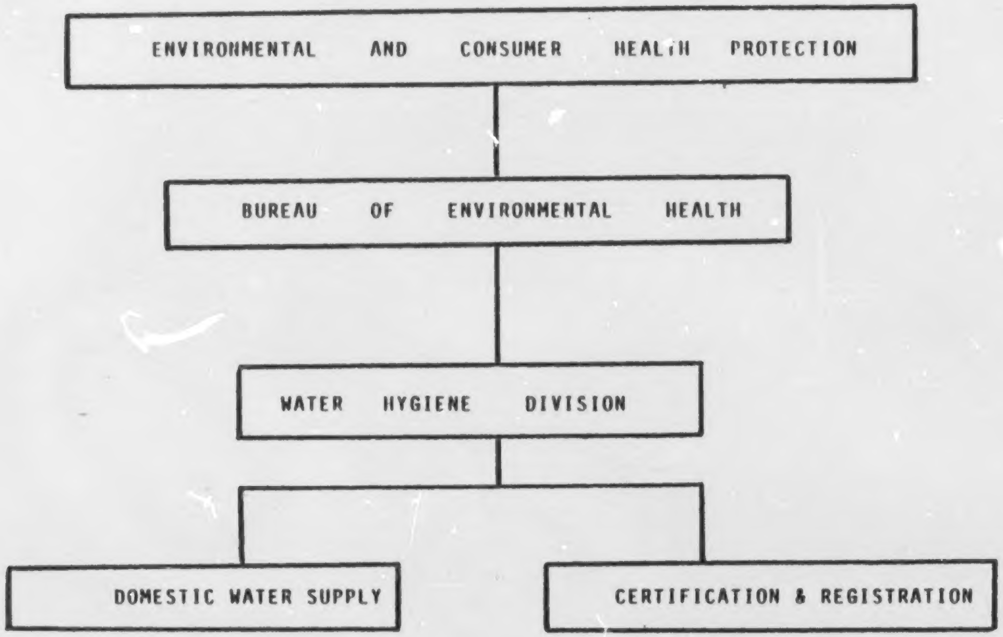
The Division, in general, is responsible for safe drinking water. In order to fulfill this responsibility, the Division is divided into two major components: Certification and Registration, and Domestic Water Supply. The responsibilities and activities of the Certification and Registration Section are discussed in Part D, "Training and Certification."

The Domestic Water Supply Section specifically conducts the following elements of the drinking water program:

- ° Plan and specification review of public water systems and swimming pools;
- ° Water surveys and/or inspections of public facilities, common carriers, ice plants and bottled water sources, and poultry processing;

STATE OF TEXAS
DEPARTMENT OF HEALTH RESOURCES
ENVIRONMENTAL & CONSUMER HEALTH PROTECTION

Figure 17 ORGANIZATIONAL CHART Illustrating Water Hygiene Division


ENVIRONMENTAL AND CONSUMER HEALTH PROTECTION
BUREAU OF ENVIRONMENTAL HEALTH
WATER HYGIENE DIVISION
DOMESTIC WATER SUPPLY
CERTIFICATION & REGISTRATION

- Approval or certification of public facilities, poultry processing plants and common carriers;
- Inventory and Evaluation;
- Fluoridation;
- Water resource planning;
- Tabulation of data; and,
- Research activities.

The following table details the current staffing levels of the drinking water workforce of the Division. The turnover rate has declined from 15% to the indicated 5% per annum. This is due, substantially, to increased salaries.

TABLE XIX

TEXAS DEPARTMENT OF HEALTH RESOURCES

Bureau of Environmental Health
Division of Water Hygiene
Current (1976) Staffing Level

Position	1976	%/annum turnover (average)
Engineer & Director	26	5%
Engineering Assistant	3	N/A
Sanitarian	11	
Statistical Clerk	4	N/A
Health Program Specialist	1	5%
Secretarial	13	N/A
TOTAL	58	N/A

Although the major area of responsibility is wastewater, the Texas Water Quality Board works cooperatively with the Department of Health Resources in an effort to protect the Texas drinking water supplies. The Surveillance Section monitors streams and reservoirs that are used for public water supply. The following table details the staff of the Surveillance Section.

TABLE XX

TEXAS WATER QUALITY BOARD

Field Operations Division
Surveillance Section
Current (1976) Staffing Level

Position	1976	%/annum turnover (average)
Engineer	2	10%
Biologist	15	10%
Chemist	1	6%
Geologist	1	6%
Support Staff	5	N/A
Secretarial	3	N/A
TOTAL	27	N/A

Detailed description of the Texas Water Quality Board may be found in Section VII, entitled "Waste Water."

There are approximately 7,320 water treatment and/or distribution plant operators in Texas. The following table illustrates the operator population by classification category. Class A is the highest rating and Class D is entry level.

TABLE XXI

STATE OF TEXAS

Water Treatment & Distribution Plant Personnel
(Operators)
Current (1976) Staffing Level*

Classification	1976	%/annum turnover (average)
A	350	20%
B	1,824	22%
C	3,856	25%
D	1,290	30%
TOTAL	7,320	24%

* estimated

In addition to the above illustrated water personnel, there are approximately 45 laboratories with approximately 55 chemists and bacteriologists. There are also 26 state labs with approximately 26 bacteriologists.

C. Workforce Projections

As the population and industrial activity increase in Texas, so too will the need for drinking water personnel increase. Texas has indicated intention of assuming primary enforcement responsibility for the Safe Drinking Water Act, P.L. 93-523. The agency, to be charged with this responsibility will be the Department of Health Resources, Bureau of Environmental Health, Division of Water Hygiene. The following projections for this Division assume that the responsibilities will be so assigned.

TABLE XXII

TEXAS DEPARTMENT OF HEALTH RESOURCES

Bureau of Environmental Health
Division of Water Hygiene
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Director	1	1	1	1	1	1	N/A	0%
Engineer	25	30	30	33	36	39	5%	10%
Engineering Assistant	3	3	3	5	7	9	5%	27%
Sanitarian	11	11	11	14	17	20	5%	13%
Statistical Clerk	4	4	4	4	5	5	N/A	5%
Health Program Specialist	1	1	2	2	2	2	5%	20%
Secretarial	13	17	18	20	22	25	N/A	14%
TOTAL	58	67	69	79	90	101	N/A	12%

The laboratory personnel will experience an increase in numbers if the state assumes primary enforcement responsibility for the Act. The table below details the anticipated growth to 1982.

TABLE XXIII

TEXAS DRINKING WATER LABORATORY PERSONNEL

Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Water Treatment Plant Lab Personnel[1]	55	57	60	63	69	73	*	6%
State Laboratory Personnel[2]	26	27	29	30	32	33	*	6%
TOTAL	81	84	89	93	101	106	N/A	6%

* unavailable;

[1] Chemists, Bacteriologist mostly;

[2] Bacteriologists mostly.

Increased technology will demand better trained plant personnel. New facilities will be built and properly trained operators will be required. The following table depicts anticipated workforce requirements for plant operators to 1982.

TABLE XXIV

STATE OF TEXAS

Water Treatment & Distribution Plant Personnel (Operators) Workforce Projections to 1982 (est.)

Class	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
A	350	367	386	405	425	446	20%	5%
B	1824	1915	2010	2110	2215	2325	22%	5%
C	3856	3933	4129	4335	4547	4769	25%	5%
D	1290	1354	1421	1492	1567	1645	30%	5%
TOTAL	7320	7569	7946	8342	8754	9185	24%	5%

D. Training and Certification

Certification of operating plant personnel is required in Texas. The certification of water operators is a responsibility of the Texas Department of Health Resources Water Hygiene Division, Certification and Registration Branch. The following responsibilities and activities are conducted by the Branch:

- Schools for operators, including water treatment plant, swimming pool, bottled water, and general sanitation personnel from across the state;
- Certification of water operators, swimming pool operators and bottled water plant operators;
- Registration of sanitarians; and,
- Production and distribution of publications and research activities.

A great deal of training is accomplished by the 14 traveling instructors from Texas A & M University. Approximately 244 courses were conducted in 63 counties with approximately 6,350 participants during 1975.

The Texas Water Quality Board has two training officers in the field performing on-site training. In addition, over 13 vocational high schools offer two-year water and waste water training annually, to about 100 students.

Seven annual short schools in addition to the monthly local association meetings, account for almost 50% of the training. This training is sponsored by the Texas Water Utilities Association, a 6,500 member operator association. 84,940 class hours were conducted during 1975, most of which were seminars or short schools. Currently there are 1,939 operators remaining to be trained and certified. The cooperation of state agencies is the key to the success of the state's operator training and certification program.

E. Career Potential

Career opportunities will be available in the field of drinking water over the next three to five years. Operating personnel will be in demand as plants are constructed and/or upgraded. These new plants will require supervisory personnel also. However, increased training will be required as job prerequisites. Technological advances in operations as well as the advent of more specialized and complicated equipment will require an increasingly skilled workforce. Jobs in plant operations and supervision will increase, as will support personnel positions such as maintenance.

F. Conclusion

The depletion of Texas aquifers, especially the Ogallala, is of primary concern to the citizenry. Increased demonstrations of concern are being illustrated as is exemplified by the Edwards Aquifer sole source determination under the Gonzales Amendment. Conservation and protection of available supplies will predominant in future planning efforts at the state and local levels.

Underground injection, of minor concern in many areas of the country, is a paramount issue in Texas. The importance of control of underground injection activities is dramatically illustrated by EPA figures which indicate that 80,000 injection operations associated with oil and gas facilities are located in Texas. The primary objective of control of underground injection activities is the protection of ground water which is currently, or will be, utilized as drinking water supplies. The area of underground injection control is also a program for which the State of Texas had indicated intention of assuming primary enforcement responsibilities.

The overall Texas drinking water workforce profile should evidence at least a five percent per annum increase. It is conceivable however, that the requirements may exceed the five percent per annum growth. Engineers, Geologists, Biologists, Chemists and other scientific degreed personnel will be in demand as the state's responsibilities and technological expertise increase.

V. RADIATION

A. Introduction

Texas was the fifth state to become an "agreement" state with the Atomic Energy Commission, or Nuclear Regulatory Commission (NRC) as it is called today. Agreement status refers to a situation in which the state has entered into an agreement with the Nuclear Regulatory Commission which allocates certain of the Commission's responsibilities to the state. This agreement is accomplished pursuant to Section 274 of the Atomic Energy Act of 1954. In the matter of the State of Texas, the effective date of the agreement was 1963.

Under the terms of this agreement, the state licenses byproduct, source, and special nuclear materials. Currently, Texas has a total of 1,338 licenses across the state. The NRC maintains 118 of these, while the state has accomplished 1,220 licensing activities.

Texas currently has an estimated 235 radium - radon facilities of which 110 are medical and 95 are industrial. The remaining 30 are classified as "other." During the fiscal year 1975, the state reported 10 incidents or investigations involving radium or radon. The total number of incidents or investigations of this nature, reported by 17 states equalled 17. Texas, therefore, reported 50% of the total.

There are 115 estimated particle accelerators within the state at present. The estimated number of non-healing arts facilities utilizing X-ray is 220, and the medical diagnostic machines approximate 9,753.

Since 1971, Texas has had statutes which control all electromagnetic radiation. Chiropractors came under the statutes for user control in the year 1961.

The Texas Radiation Control Act provides for a program of effective control of radiation sources in the protection of the occupational and public safety and well-being.

As may be surmised by the preceding, Texas conducts an extensive radiation control program. Currently, only five states across the country maintain radiological health personnel which number in excess of the Texas state and local workforce.

B. Workforce Profile

The primary responsibility for radiation control in Texas has been allocated to the Department of Health Resources, Occupational Health & Radiation Control Division, Radiation Control Branch. An organizational chart is included on the following page. The primary functions of the Branch consist of the implementation and administration of the Radiation Control Act, and the coordination and fulfillment of the terms of the Agreement between the state and the Nuclear Regulatory Commission (NRC).

The NRC has established guidelines for number of radiation program personnel of one person per 100 licenses. However, Texas is geographically so large that these guidelines cannot be utilized to determine the needs for the Texas radiation program. The following table details the current staffing levels of the Radiation Control Branch.

TEXAS DEPARTMENT OF HEALTH RESOURCES

BUREAU OF ENVIRONMENTAL HEALTH

DIVISION OF OCCUPATIONAL HEALTH & RADIATION CONTROL

RADIATION CONTROL BRANCH - Organizational Chart

Figure 18

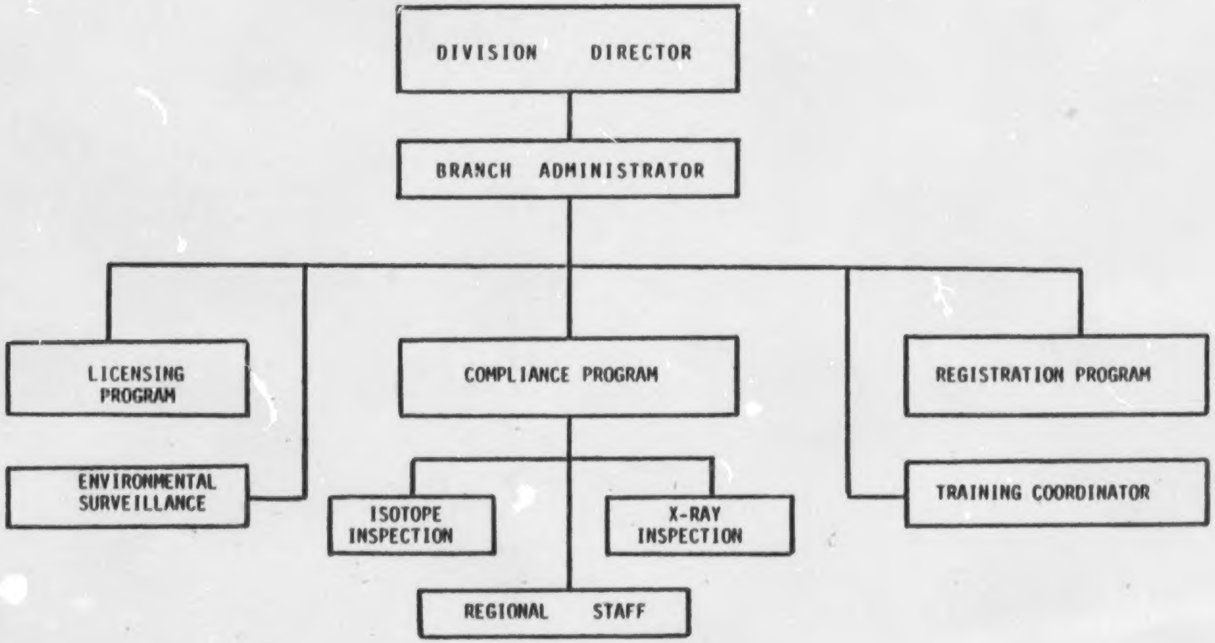

DIVISION DIRECTOR
BRANCH ADMINISTRATOR
LICENSING PROGRAM
ENVIRONMENTAL SURVEILLANCE
COMPLIANCE PROGRAM
ISOTOPE INSPECTION
X-RAY INSPECTION
REGIONAL STAFF
REGISTRATION PROGRAM
TRAINING COORDINATOR

TABLE XXV

TEXAS DEPARTMENT OF HEALTH RESOURCES

Occupational Health & Radiation Control Division
Radiation Control Branch
Current (1976) Staffing Level

Position	1976	%/annum turnover (average)
Branch Administrator	1	0%
Engineer	4	0%
Engineer Technician	3	5%
Environmental Health Specialist	12	5%
Lab Technician*	4	3%
Radiochemist*	1	0%
Secretarial	8	N/A
TOTAL	33	N/A

* Laboratory Personnel

Statewide personnel estimates are detailed in the following table. It should be emphasized that these figures are representative of best professional judgements of experts from the radiation field.

TABLE XXVI

STATE OF TEXAS

Personnel Occupationally Associated with Radiation
Current (1976) Staffing Level
(estimated)

Position	1976	%/annum turnover (average)*
Dental X-Ray Personnel	4,500	10%
Medical X-Ray Personnel	6,500	12%
Industrial User Personnel	2,000	5%
Radioactive Materials Personnel	3,000	3%
Research (i.e., universities) Personnel	50	2%
TOTAL	16,050	N/A

* estimated

C. Workforce Projections

The state is under a "freeze" regarding hiring of additional personnel. No growth in the Radiation Control Branch is anticipated for the next two years. The table below presents the estimated workforce requirements to 1982 and depicts no growth over the next two years.

TABLE XXVII

TEXAS DEPARTMENT OF HEALTH RESOURCES

Occupational Health & Radiation Control Division
Radiation Control Branch
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Branch Administrator	1	1	1	1	1	1	0%	0%
Engineer	4	4	4	5	5	5	0%	5%
Engineer Technician	3	3	3	4	4	4	5%	7%
Environmental Health Specialist	12	12	12	13	13	13	5%	2%
Lab Technician*	4	4	4	4	4	4	3%	0%
Radiochemist*	1	1	1	2	2	2	0%	20%
Secretarial	8	8	8	9	9	9	N/A	3%
TOTAL	33	33	33	38	38	38	N/A	3%

* Laboratory personnel

Turnover was quite high in the Division until the last few years. State salary scales have been increased and are now more competitive with private industry.

The Radiation Control Branch currently with a staff of 33 administers the state Act, licenses the use of radioactive materials, and conducts the other programs including activities relative to registration, compliance, environmental surveillance, isotope and X-ray inspection, and training coordination. Changing nuclear technology will increase the range and number of programs designated to this Division, as will new legislation.

Increased emphasis placed upon nuclear energy development and the possibility of hazardous (especially nuclear) waste being transported through the state will be influential factors in future determinations of the state's radiation control workforce profile.

In the private sector, medical/dental X-ray personnel are anticipated to experience an estimated four percent per annum growth.

Industrial use of radioactive materials is experiencing considerable acceleration, especially in the petrochemical industry where radioactive materials are utilized in various chemical process activities. Workforce growth in this area will approximate five percent per annum for the next 5 to 7 years.

The increase in agreement licenses is estimated at five percent per year. This would indicate workforce requirements for this sector approximating four to five percent per annum also.

Research personnel will probably experience little or no growth over the next three to five years.

The following table estimates projected workforce requirements for the statewide personnel to 1982.

TABLE XXVIII

STATE OF TEXAS

Personnel Occupationally Associated with Radiation Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth* (average)
Dental X-Ray Personnel	4500	4680	4867	5062	5264	5475	10%	4%
Medical X-Ray Personnel	6500	6760	7030	7311	7603	7907	12%	4%
Industrial User Personnel	2000	2100	2205	2315	2430	2551	5%	5%
Radioactive Materials Personnel	3000	3120	3245	3375	3510	3650	3%	4%
Research Personnel	50	50	50	50	50	50	2%	0%
TOTAL	16050	16710	17397	18113	18857	19634	N/A	4%

* estimated

D. Training and Certification

As may be seen on the organizational chart, the Division of Occupational Health & Radiation Control, Radiation Control Branch, maintains a training section. When the Training Officer is not in the field, in-house seminars and workshops are conducted for the Division personnel. Ordinarily these sessions emphasize rules, regulations and overall refresher topics.

The University of Texas conducts a short course emphasizing radiation control topics. Most of the Branch personnel endeavor to attend these short courses.

The NRC conducts extensive training and professional upgrading seminars and workshops. Ordinarily these courses are conducted at Oak Ridge University in Tennessee. Two branch staff members will be allowed to attend this ten-week course this year.

There is no certification at present in Texas. For the most part, discussions of certification center upon X-ray personnel. In many areas of the country there is interest in investigating the possibilities of establishing a certification program. These persons are ordinarily quite young, with high school level education and enter the field straight from the classroom. Job descriptions for these persons includes other activities such as scheduling of patients and clerical activities. For the most part, the majority of their time is not allocated to activities which expose them to radiation.

For these persons some training should be required for the health and safety of worker, patient and medical personnel. But certification is not anticipated as an alternative available to these persons, at least over the forthcoming three to five years.

E. Career Potential

Career opportunities, as a result of expansion in the radiation control field, are anticipated to be available in the medical, industrial, nuclear, and dental areas. Demand will exist for technically trained people, to work as medical and nuclear technicians, for example, in supporting activities of research and development programs.

The proliferation of nuclear energy will create opportunities for health physicists. Nuclear technicians, X-ray technicians, generally trained health physicists, and personnel with uranium expertise are expected to represent career potentials over the next three to five years in Texas.

Currently, there is an abundant supply of personnel in the radiation field. For example, the Division rejects 12 applicants annually. This excess manpower will be assimilated as nuclear power and uranium development activities proceed.

F. Conclusion

The use of radiation and radioactive materials has increased in Texas since 1963 when agreement status was accorded. Uranium is now mined in Texas and planning has begun for nuclear power plants at several sites across the state.

Radiation related problems within the state are varied and sometimes unique. Liquid as well as solid waste will become an area of increased interest to radiation personnel, as the uranium mining activities proceed.

The area of radiation control in Texas presents an optimistic career potential outlook to 1982. Radioactive materials and activities are becoming an increasingly important aspect of societal developments in the areas of medicine, industry and energy development.

Education programs, instituted in the state, are presently adequate to accommodate requirements. However, increased health training programs, especially two year programs, could be expanded in the universities.

VI. SOLID WASTE

A. Introduction

Solid waste management has gained new dimension in Texas during the last few years. Surrounding states regard the Texas solid waste legislation as a model within the field.

Texas has identified approximately 1,200 solid waste sites across the state. An estimated 96% of these sites are public and the remaining 4% are private facilities. The sites are categorized according to certain parameters and are differentiated as follows:

- Type I: Serves a population in excess of 5,000; staffing levels are from two to 15 and on an average consist of three or four; site is covered daily.
- Type II: Serves a population of 5,000 or less; staffing usually consists of one person; site is covered weekly.
- Type III: Serves a population of 1,500; staffing usually consists of part-time help and site is covered a minimum of once per month.
- Type IV: For disposal of brush and construction-demolition material; staff is ordinarily one to two persons; when utilized to capacity this type of site requires more personnel and equipment.
- Type V: Staffing is usually composed of three persons; transfer stations are utilized; also includes sites utilizing non-polluting incinerators and resource recovery stations. When resource recovery is utilized five or more personnel are required.
- Type VI: Unproven or experimental methods of managing or utilizing municipal solid waste.

B. Workforce Profile

In accordance with the Texas Solid Waste Disposal Act, the State of Texas has divided responsibilities for solid waste management among three agenci determined by the source of the waste.

The responsibility for waste derived from the exploration and development of oil and gas has been delegated to the Texas Railroad Commission; industrial solid waste, generated as a result of manufacturing, including agricultural waste, is the responsibility of the Texas Water Quality Board; all municipal solid waste is the Texas Department of Health Resources' responsibility. If a situation involves both industrial and municipal, the responsibility is allocated to the Texas Department of Health Resources.

Primary responsibilities, however, for the administration of the Texas Solid Waste Disposal Act, have been delegated to the Texas Department of Health Resources. Surveillance of municipal sites and enforcement of standards are two major activities. This Division is also involved in engineering and geological evaluation of disposal facilities and will become extensively involved in the new federal Resource Conservation and Recovery Act. An organizational chart is presented on the following page. The table below illustrates the current staffing levels for the Solid Waste Management Division, Department of Health Resources.

TEXAS DEPARTMENT OF HEALTH RESOURCES

DIVISION OF SOLID WASTE MANAGEMENT

Figure 19 Organizational Chart

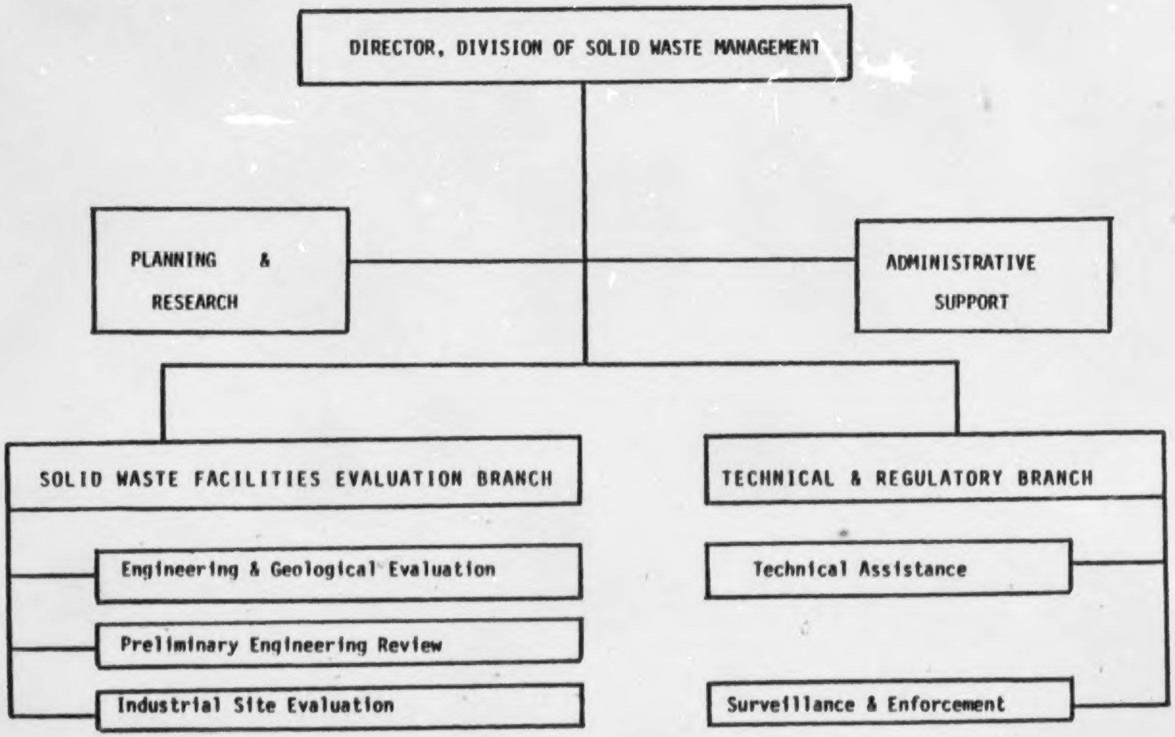

DIRECTOR, DIVISION OF SOLID WASTE MANAGEMENT
PLANNING & RESEARCH
ADMINISTRATIVE SUPPORT
SOLID WASTE FACILITIES EVALUATION BRANCH
Engineering & Geological Evaluation
Preliminary Engineering Review
Industrial Site Evaluation
TECHNICAL & REGULATORY BRANCH
Technical Assistance
Surveillance & Enforcement

TABLE XXIX

TEXAS DEPARTMENT OF HEALTH RESOURCES

Bureau of Environmental Health
Division of Solid Waste Management - Central Office
Current (1976) Staffing Level

Position	1976	%/annum turnover (average)
Director	1	0%
Engineer	10	5%
Attorney	4	5%
Engineer Assistant	8	5%
Health Specialist	3	5%
Geologist	1	5%
Planner	1	5%
Secretarial	7	N/A
TOTAL	35	N/A

Additionally, the Texas Department of Health Resources has personnel available in each of its 10 regional offices which are located in strategic positions throughout the state. Each regional office is composed of a chief engineer, other professional engineers, and several health specialists. Approximately one person per region can be counted toward full-time solid waste management duties.

The Texas Water Quality Board implements the Texas Solid Waste Disposal Act only insofar as it pertains to the management of industrial solid waste. This responsibility primarily consists of technical support, permit drafting, inspection to ensure compliance with regulations, and enforcement. The following table details the current staffing levels. Personnel are utilized from other Divisions for purposes of technicial assistance.

TABLE XXX

TEXAS WATER QUALITY BOARD

Solid Waste Management Personnel
Current (1976) Staffing Level

Position	(a)*	(b)*	(c)*	(d)*	1976	%/annum turnover (average)
Director	0	0	0	0	1	0%
Attorney	6	0	1	0	7	1%
Engineer Technician	3	0	0	0	3	5%
Engineer	0	6	0	6	12	3%
Biologist	0	0	0	2	2	2%
Chemist	0	0	0	0	2	3%
Secretarial	1	1	1	1	4	N/A
TOTAL	(10)	(7)	(2)	(9)	31	N/A

(a) Enforcement;
(b) Central Operations;
(c) Hearings;
(d) Field Operations.

*May not equal 1976 total.

Solid waste management staffing levels for the Texas Railroad Commission have not been determined at the present time.

The total number of people working across the state at solid waste sites has been approximated at 3,153. This number was calculated by correlating population density with site requirements. The Texas Department of Health Resources considers this estimate to be an accurate gauge of current statewide personnel. Of this total, approximately 300 personnel are estimated to be occupationally involved in solid waste management at industrial sites. The number of industrial sites is presently very few but these types of sites will increase somewhat during the next three to five years.

Approximately 500 to 750 persons from the private sector have been identified. Private waste management operators are increasing especially in areas where they can serve a population in excess of 25,000. Private firms currently service approximately 125 disposal sites. The number will increase as these firms have developed a reputation for efficiency and responsiveness to the needs of the community.

C. Workforce Projections

Historically, solid waste has not been high on the list of environmental concerns in Texas. With the passing of recent state and federal legislation, however, the state anticipates increases in solid waste program emphasis. Workforce requirements in solid waste will experience increases due to past neglect and increasing needs. Approximately 25 sites a month are granted permits by the Texas Department of Health Resources. The problems of solid waste management have come to the attention of the public which will cause workforce profiles to continue to expand. The state, accelerating more stringent enforcement procedures, will result in personnel growth also.

Although the Texas state policy for 1977 allows for increased funding to existing program with few increasing numbers of personnel, the Division of Solid Waste Management, Department of Health Resources anticipates a 100% increase in staff over the next five years. The Texas Water Quality Board's solid waste program is anticipated to increase by 100% during the same time period. Within the next two years, the Texas Water Quality Board will gain increased control over industrial waste through permits. Therefore, increases in permitting and stronger enforcement activities will necessitate increases in solid waste management personnel.

The following tables detail the projected workforce requirements for the Texas Department of Health Resources and the Texas Water Quality Board in the area of solid waste management.

TABLE XXXI

TEXAS DEPARTMENT OF HEALTH RESOURCES

Bureau of Environmental Heatlh
Division of Solid Waste Management
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Director	1	1	1	1	1	1	0%	0%
Engineer	10	10	13	31	31	31	5%	34%
Attorney	4	4	4	6	6	6	5%	10%
Engineer Assistant	8	8	8	9	9	9	5%	3%
Health Specialist	3	3	3	4	4	4	5%	7%
Geologist	1	1	1	3	3	3	5%	40%
Planner	1	1	1	1	1	1	5%	0%
Secretarial	7	7	7	15	15	15	N/A	23%
TOTAL	35	35	38	70	70	70	N/A	19%

TABLE XXXII

TEXAS WATER QUALITY BOARD

Solid Waste Management Personnel
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Director	1	1	1	1	1	1	0%	0%
Attorney	7	7	8	9	9	10	1%	8%
Engineer Technician	3	3	6	9	10	13	5%	37%
Engineer	12	12	14	18	20	23	3%	14%
Biologist	2	2	2	3	3	3	2%	10%
Chemist	2	2	2	3	3	3	3%	10%
Secretarial	4	5	6	7	8	9	N/A	18%
TOTAL	31	32	39	50	54	62	N/A	15%

Growth in the private sector workforce is also anticipated, especially in more densely populated areas. A 10% growth per annum can be anticipated, although since the private firms are increasing more rapidly than municipal collectors, they could experience growth in excess of 10% per annum. The following table attempts to illustrate this growth to 1982.

TABLE XXXIII

STATE OF TEXAS

Solid Waste Management Personnel
(Other Than State Agency Staff)
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Industrial Site Personnel	300	318	337	357	378	401	8%	6%

TABLE XXXIII

(continued)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Municipal Site Personnel	2628	2427	2597	2779	2974	3182	12%	4%
Private Contracting Personnel	585	643	707	777	854	939	8%	10%
TOTAL	3513	3388	3641	3913	4206	4522	10%	5%

D. Training and Certification

There is very little training for solid waste management personnel in Texas at present. This is due to lack of training funds. Extension courses at Texas A & M are given for bulldozer operators, site operators, and project engineers. There remains an absence of skilled training personnel in the state, however.

The Texas Water Quality Board has periodic in-house training programs for their field staff. This training is in the form of two day workshops. These sessions also impart information on guidelines of new legislation. The Texas Water Quality Board and Texas Department of Health Resources personnel also attend conferences sponsored by the U.S. Environmental Protection Agency, and Texas A & M extension courses.

At the present time, there is no certification for operators at either industrial or municipal sites. However, the Texas Department of Health Resources is considering establishment of certification of operators and owners in the near future. Training programs and required funds are necessary prerequisites. The establishment of a certification program would increase safety measures or at least the knowledge of safety practices at the local level. The solid waste management personnel suffer the greatest occupational accident and injury rate of any category described. Increased attention to the well-being of the operator and supervisory personnel insofar as safety aspects, is needed.

E. Career Potential

The integration of more advanced technology, along with more stringent regulations and public demand for more efficiently operated sites indicates good career potential in the solid waste management field. Better educated personnel will be in demand. Managers of large Type I sites in 90% of the cases investigated, need operator and supervisory training on an associate degree level. A supervisor of a resource recovery operation will be required to have a degree from a four year institution. Supervisors and operators of other types of sites will need a two-year program as the best option to increase solid waste management knowledge.

Industrial and private sector personnel will be added by their own resources. However, growth in sub-professional positions as tract soil testers, bulldozer and drilling operators, truck drivers, and machinery operators for recycling, will be in greater demand at the municipal level than at industrial operations. This, in part, may be due to available government funding.

There are a number of other fields requiring various levels of skill and professional training which may develop in the future as a consequence of more stringent control and enforcement. Examples of occupational categories which should be available to 1982 include: engineering technician, garbage collection foreman, garbage collector, incinerator plant foreman, incinerator operator, incinerator plant attendant, landfill disposal assistant, landfill foreman, scale man, solid waste management assistant, surveying technician, heavy equipment operator, and heavy truck operator.

F. Conclusion

Due to recent public involvement, new legislation and increased funding, solid waste management has become a more important aspect of the environmental concerns of Texas. Growth across the field in surveillance and enforcement, technical design, and operations personnel will approximate 10% to 18% per annum to 1982. Although new personnel will enter the field, training and certification of present personnel is crucial. Related ecological considerations such as runoff pollution (storm water), leeching and disposal of hazardous and toxic wastes will be factors which influence the increase or decrease of solid waste management personnel over the next few years.

Texas Department of Health Resources officials stated that workforce profiles will also be influenced by new legislation. This factor will affect upgrading of solid waste sites as well. In order to accomplish this, certification should be developed along with increased training. Presently, 50% of the Type I sites and 100% of the Type II and III sites are inadequately staffed to meet regulations stipulated by new legislation. In order to meet proposed standards, a 60% increase in present workforce levels is needed mostly at sites that service 50,000 people or less. Full-time direction attendants may be required at sites that presently have no on-site personnel. Upgrading of sites without the requisite training of personnel could prove futile to site management personnel.

Two-year associated degree programs in solid waste management implemented by community colleges might be a contributing factor in properly educating personnel for future certification to supervise as well as operate solid waste sites. Resource recovery personnel at the supervisory level will need to be degreed, however. Training is the critical future aspect of successful solid waste management practices in Texas.

VII. WASTE WATER

A. Introduction

In 1967, under the Texas Water Quality Act, water quality zones were established statewide. This was a means of categorizing streams into definitive areas. But the state has now redefined these zones into discreet units called segments. These segments are designated as effluent limitation segments or as water quality segments. Effluent limitation segments are described as those in which the water quality is better than required in the Water Quality Standards. Water quality segments are those segments in which water quality is not expected to meet applicable standards even after the application of the best practicable control technology for industry and secondary treatment for public waste water treatment plants.

In 1971, Senate Bill 835 was passed which required all cities with populations in excess of 5,000 to form their own water pollution control and abatement programs. A city of less than 5,000 may, and indeed is encouraged to, establish a program. However, there are 224 municipalities in Texas which are within the "required" category.

The State of Texas has determined that the treatment goals specified under the Federal Water Pollution Control Act P.L. 92-500 Amendments of 1972, are attainable although not by the predetermined dates.

Substantial improvements have taken place across the state in the areas of water pollution. But problems do exist. Agricultural wastes constitute one of the most serious threats to the waters of Texas. The manifestations of agricultural wastes include mineralization return flows, animal and poultry wastes, pesticide and herbicide laden runoff, crop residue, and silting.

A problem which is somewhat unique to Texas and which is now well under control is subsurface or underground waste disposal. Today the most necessary component to this program may be the education of the public as to the degree of safety of such procedures.

According to the Texas Water Quality Board, underground waste disposal is broadly defined as the placing of waste substances beneath the surface of the ground and includes sanitary landfills, septic tank lateral lines, as well as injection wells which are the most common utilization of the process.

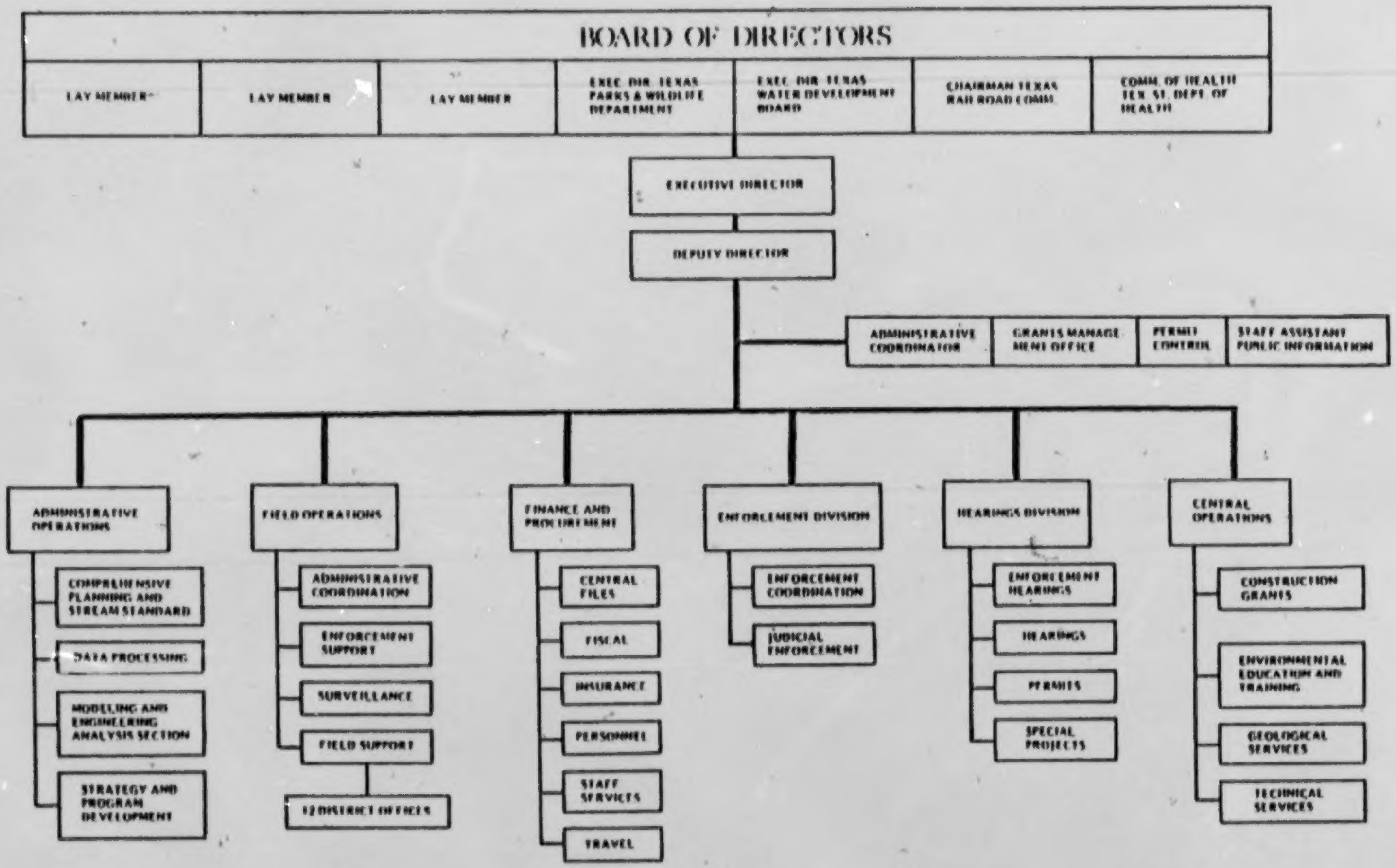
Texas began issuing permits for the disposal of large quantities of salt water by means of injection wells. Increased quantities of domestic waste were being disposed of into subsurface strata which was non-productive of oil or gas. By 1961, the state adopted legislation regulating the injection of all wastes into the subsurface. Between 1961 and 1971, the legislation was amended several times, and today is known as the Disposal Well Act and is Chapter 22 of the Texas Water Code. It has been estimated that 350 million barrels of combined municipal and industrial waste is injected into the Texas subsurface annually.

B. Workforce Profile

Pursuant to the Texas Disposal Well Act and the Texas Water Code, the Texas Water Quality Board has been designated as the agency with

TEXAS WATER QUALITY BOARD

Figure 20 ORGANIZATIONAL CHART


BOARD OF DIRECTORS
LAY MEMBER*
LAY MEMBER
LAY MEMBER
EXEC DIR TEXAS PARKS & WILDLIFE DEPARTMENT
EXEC DIR TEXAS WATER DEVELOPMENT BOARD
CHAIRMAN TEXAS RAILROAD COMM.
COMM. OF HEALTH TEX. ST. DEPT. OF HEALTH
EXECUTIVE DIRECTOR
DEPUTY DIRECTOR
ADMINISTRATIVE COORDINATOR
GRANTS MANAGEMENT OFFICE
PERMIT CONTROL
STAFF ASSISTANT PUBLIC INFORMATION
ADMINISTRATIVE OPERATIONS
COMPREHENSIVE PLANNING AND STREAM STANDARD
DATA PROCESSING
MODELING AND ENGINEERING ANALYSIS SECTION
STRATEGY AND PROGRAM DEVELOPMENT
FIELD OPERATIONS
ADMINISTRATIVE COORDINATION
ENFORCEMENT SUPPORT
SURVEILLANCE
FIELD SUPPORT
12 DISTRICT OFFICES
FINANCE AND PROCUREMENT
CENTRAL FILES
FISCAL
INSURANCE
PERSONNEL
STAFF SERVICES
TRAVEL
ENFORCEMENT DIVISION
ENFORCEMENT COORDINATION
JUDICIAL ENFORCEMENT
HEARINGS DIVISION
ENFORCEMENT HEARINGS
HEARINGS
PERMITS
SPECIAL PROJECTS
CENTRAL OPERATIONS
CONSTRUCTION GRANTS
ENVIRONMENTAL EDUCATION AND TRAINING
GEOLOGICAL SERVICES
TECHNICAL SERVICES

primary responsibility in the area of water pollution control and abatement.

The Texas Water Quality Board with over 230 staff employees is responsible for the issuance of permits, holding of public hearings, enforcement, administration of the construction grants program, stream monitoring, and other areas related to statewide water quality management. The Texas Water Quality Board, Board of Directors is a seven member board chosen by the Governor with the consent of the Senate. A detailed description of the Board may be seen on the following page. Six division make up the administrative components of the Board. Included are the following:

- ° Administrative Operations,
- ° Field Operations,
- ° Finance and Procurement,
- ° Central Operations,
- ° Enforcement, and
- ° Hearings.

Administrative Operations has four major areas of responsibility. These areas include: comprehensive planning, engineering analysis and modeling, state strategy and special projects, and automation (computer services).

Field Operations include the responsibilities of the district offices, surveillance, field support, enforcement support, and administrative coordination.

Finance and Procurement is primarily responsible for the central files and the library, purchasing, personnel, fiscal, and travel.

Central Operations is assigned four areas of involvement and technical services, construction grants, and environmental education and training.

Enforcement includes two areas of responsibility: judicial enforcement, and enforcement coordination.

Hearings is designated as the division responsible for enforcement hearings, hearings, and permits.

Overall then, the Texas Water Quality Board has the responsibility for: industrial and municipal discharge monitoring, issuing discharge permits, review of construction plans for waste water facilities, Section 208 of the Federal Water Pollution Control Act P.L. 92-5200 as amended, implementation of Texas Senate Bill 835 which requires developing and conducting of training programs for waste water treatment plant operators, and advice and assistance to the office of the Governor regarding the State Manpower Plan.

The table below details the staffing levels of the Texas Water Quality Board specifically emphasizing the water water personnel.

TABLE XXXIV

TEXAS WATER QUALITY BOARD

Waste Water Personnel
Current (1976) Staffing Level

Position	(a)[1]	(b)[2]	1976	%/annum turnover (average)
Engineer	11	18	29	5%
Biologist	23	55	78	5%
Chemist	3	12	15	5%
Geologist	1	2	3	5%
Attorney	0	1	1	*
Certificated Trainer	0	30	30	*

TABLE XXXIV

(continued)

Position	(a)[1]	(b)[2]	1976	%/annum turnover (average)
Sanitarian	0	28	28	*
Engineer Technician	3	0	3	*
Hydrologist	2	0	2	5%
Supportive Staff***	47	35	82	N/A
Secretarial	0	0	10	N/A
TOTAL	(90)	(181)	281	N/A

* unavailable;
1 may not add up to total;
2 predominately Field Officers;
(a) Central Office Personnel;
(b) District Office (12) personnel.

The Railroad Commission is the agency responsible for the issuance of underground injection well permits. The Division of Waste Water Technology & Surveillance, Texas Department of Health Resources, conducts program activities in cooperation with the Texas Water Quality Board to prevent and abate water quality conditions which may injure public health. Briefly, the activities include the following:

1. Reviews plans and specifications of proposed wastewater collection and treatment improvements which are not subject to review of the staff of the Texas Water Quality Board.

2. Assists local health authorities in the design, regulation and control of on-site private sewage facilities.

3. Reviews proposed programs and projects as to their environmental and public health implications as required by State and Federal agencies.

4. Samples are collected, as required, for monitoring of bacteriological quality of the major rivers and their tributaries, and to secure data as to levels of heavy metals and other toxic substances.

5. Coordinates and cooperates with the Texas Water Quality Board in dealing with matters involving a possible impact on public health.

The following table illustrates the Department of Health Resources current staffing levels for wastewater personnel. The Texas Railroad Commission staffing levels are not herein included.

TEXAS DEPARTMENT OF HEALTH RESOURCES
ENVIRONMENTAL & CONSUMER HEALTH PROTECTION
BUREAU OF ENVIRONMENTAL HEALTH
WASTEWATER TECHNOLOGY & SURVEILLANCE DIVISION

Figure 21 ORGANIZATIONAL CHART

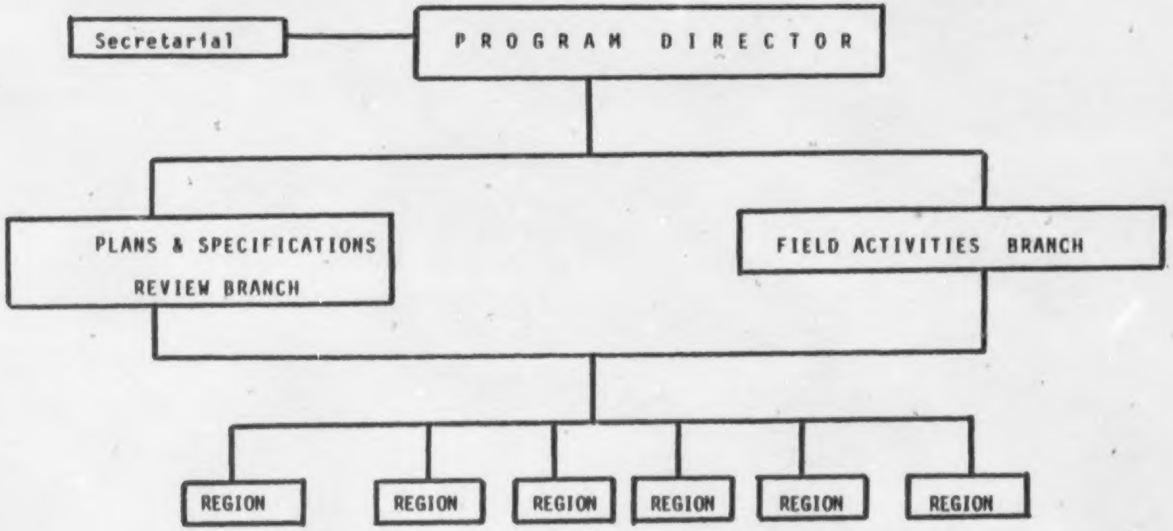

Secretarial
PROGRAM DIRECTOR
PLANS & SPECIFICATIONS REVIEW BRANCH
FIELD ACTIVITIES BRANCH
REGION
REGION
REGION
REGION
REGION
REGION

TABLE XXXV

TEXAS DEPARTMENT OF HEALTH RESOURCES

Bureau of Environmental Health
Waste Water Technology & Surveillance Division
Current (1976) Staffing Level

Position	1976	%/annum turnover (average)
Director	1	0%
Engineer	8	5%
Health Program Specialist	1	5%
Sanitarian	3	5%
Secretarial	4	N/A
TOTAL	17	N/A

Currently, there are approximately 1,400 waste water treatment facilities in the State of Texas. The table below depicts the workforce currently involved in waste water treatment, according to classification.

TABLE XXXVI

TEXAS WASTE WATER TREATMENT PLANT PERSONNEL

Current (1976) Staffing Level

Class	(a)	(b)	(c)	(d)	1976	%/annum turnover (average)
A	380	72	42	18	512	25%
B	1,558	1,834	318	258	3,968	25%
C	2,770	3,590	220	808	7,388	25%
D	504	1,264	110	353	2,231	25%
TOTAL	5,212	6,760	690	1,437	14,099	25%

(a) Supervisors;
(b) Operators;
(c) Lab Technicians;
(d) Maintenance.

C. Workforce Projections

Information regarding the projected workforce requirements, as well as the current staffing levels depicted on previous pages, was retrieved by means of on-site interviews and telephone conversations with representatives of the field. Projected workforce figures are the result of composites of estimations of professionals from across the waste water field in Texas.

Tables below depict the estimated projected workforce requirements to 1982.

TABLE XXXVII

TEXAS WATER QUALITY BOARD

Waste Water Personnel
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Engineer	29	29	31	34	34	37	5%	5%
Biologist	78	78	78	78	78	78	5%	0%
Chemist	15	15	17	17	19	19	5%	5%
Geologist	3	3	4	4	5	5	5%	12%
Attorney	1	1	1	1	2	2	*	20%
Trainer	30	30	30	33	33	33	*	2%
Sanitarian	28	28	28	28	28	28	*	0%
Engineer Technician	3	3	3	3	3	3	*	0%
Hydrologist	2	2	3	3	4	4	5%	17%
Support Staff **	82	82	82	82	82	82	N/A	0%
Secretarial	10	10	10	15	15	15	N/A	10%
TOTAL	281	281	287	298	303	306	N/A	2%

* unavailable;
** predominately field officers.

In anticipation of the State's increasing population, resulting in an accelerated rate of the establishment of organized domestic wastewater systems, increased activity in reviewing projects financed through Federal grants (HUD, Community Development Block Grants, E.D.A., etc.) and Environmental Impact Statements, and increasing demands of the public to abate the existence of malfunctioning private on-site sewage facilities, increases are anticipated to occur in the staffing levels of the Department of Health Resources. Projected workload requirements for the Department of Health Resources, Division of Wastewater Technology & Surveillance are reflected in the table below.

TABLE XXXVIII

TEXAS DEPARTMENT OF HEALTH RESOURCES

Bureau of Environmental Health
Waste Water Technology & Surveillance Division
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Director	1	1	1	1	1	1	0%	0%
Engineer	8	8	8	8	11	11	5%	5%
Health Specialist	1	1	1	1	1	1	5%	0%
Sanitarian	3	3	3	3	5	5	5%	13%
Secretarial	4	4	4	4	5	5	N/A	5%
TOTAL	17	17	17	17	23	23	N/A	7%

As depicted in the table above, the Texas Department of Health Resources, Waste Water Technology & Surveillance Division is estimated to experience an approximate seven percent per annum increase to 1982.

It is anticipated by state personnel that approximately 1,400 new operators will be required by 1982. The following table details this growth of ten percent over the next five years.

TABLE XXXIX

TEXAS WASTE WATER TREATMENT PLANT PERSONNEL

Workforce Projections to 1982 (est.)

Class	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
A	512	512	572	622	622	622	25%	4%
B	3968	3968	4154	4361	4711	4711	25%	4%
C	7388	7388	7757	8144	8564	8564	25%	3%
D	2231	2231	2343	2439	2611	2611	25%	4%
TOTAL	14099	14099	14826	15566	16508	16508	25%	3%

D. Training and Certification

The Texas Water Quality Board has a field representative who acts as a training officer and conducts on-job-training programs. Emphasis is allocated to training of small to intermediate sized municipalities with limited training capabilities within their own systems. The Extension Service of the University of Texas conducts five-day courses which emphasize the fundamentals of physical and chemical methods of treatment, and also stress the design and operation of waste water treatment facilities.

Waste water treatment technology is becoming increasingly more sophisticated. Operators will require intensified training in order to increase skills and knowledges required to operate these plants. As a result of advancing technology, 116 new extended aeration plants are planned for the future. With existing plants, an increasing number of operators will require training to properly operate and maintain these new facilities.

The Environmental Education and Training Section of the Texas Water Quality Board sponsors courses to meet this need. To date, 241 people have been trained, although 513 to 620 still need to be trained. This 513 to 620 figure is applicable only to existing plants, not to the planned ones. This number may easily double.

Examinations for certification of water and waste water operators are administered by the Texas Department of Health Resources. Certification classifications include A through D, with A being the highest category. Class C and above qualified operation for work in all plants.

E. Career Potential

There are a number of skill areas and degreed positions which are presently accessible to those entering the field. Automation will certainly have its effect, but all indications point to an expansion of the waste water control field. Some areas requiring less than degree training are: certified operators, electricians, mechanics, equipment operators, clerical, computer programming, key punch, technical assistants, foreman, and laboratory technicians.

In the professional, usually degreed areas, there will be a continuing but gradual expansion of workforce requirements for individuals specializing in sciences and engineering including: biologists, chemists, engineers (mechanical, electrical, sanitary, civil, general), systems analysts, and, administrators.

The potential for careers in the field will depend to a large extent on fiscal commitment to future needs and to regulations regarding standards for treatment facilities. Increased mining activities will further affect the overall picture, as such activities impact water quality.

F. Conclusion

The extensive efforts on the part of Texas to eliminate and/or abate water pollution have resulted in substantial improvements across the state. The most dramatic areas of improvement are seen in regions historically described as polluted. These include: the Trinity River below Dallas, the Texas City Ship Channel area, the tidal portion of the Neches River which is densely populated and heavily industrialized, the San Antonio River below the city of San Antonio, the Corpus Christi Inner Harbor, and the Sabine River from Gladewater to headwaters of the Toledo Bend Reservoir.

Of unusual interest is the process in Texas of injection of wastes into the underground strata. Eventually all wastes created by humans are either returned to the atmosphere, the oceans, or to the solid part of the earth referred to as the lithosphere. Texas utilizes the process of disposition of waste into the subsurface. The state is cognizant, however, that strict control methods must be imposed upon these procedures. Pursuant to this philosophy, the state has enacted the Disposal Well Act and has designated the Texas Water Quality Board as the administrative agency, to act in cooperation with the Texas Railroad Commission. The Texas Water Quality Board defends the subsurface disposal of waste, which includes aqueous and gaseous fluids devoid of solids other than those of minute size. Ordinarily the strata chosen to receive these wastes are aquifers containing highly mineralized water.

Unlike surface stream disposal, subsurface injection is eventually limited by volume constraints. Therefore, the development of increasingly advanced technological waste water treatment methods is encouraged. Eventually this method of disposal should be restricted to radioactive, refractory, and malodorous wastes.

VIII. ENERGY

A. Introduction

Texas is a leading energy resource state. Texas has led the nation for the last 40 years in mineral output value and ranks first in output of petroleum (crude), natural gas, natural gas liquids, carbon black, magnesium chloride, magnesium metal, natural graphite, and value of cement and recovered sulphur output. Texas also produces substantial quantities of aluminum metal, metallic sodium, uranium, clays, lime, salt, sodium sulphate, helium and sand and gravel.

Since Texas is a major producer of petroleum and natural gas, the history of these basic mineral fuels as well as associated products, is extensive. Petroleum and natural gas contribute more than any other activity to the Texas economy. The possible exception to this fact is agricultural production which would represent a close second in the overall economy of the state.

In 1901, a great gusher erupted in an oil well being drilled near Beaumont. This event was the first salt dome oil discovery, and created a sensation around the world. Spindletop, as this well was named, was responsible for encouraging exploration and drilling across the state. Spindletop and the year 1901 are the most famous landmarks of the state's petroleum history.

From 1895 to 1943, bituminous coal, including canal coal, was a significant energy source in Texas. These mines produced in excess of 24 million tons. Today, they are inactive. Renewed interest however, has resulted from our national energy crisis. Currently, reevaluation of Texas coal is on-going and production may begin in the near future.

As with bituminous, lignite coal production was significant prior to the discovery of oil and gas. However, the large lignite deposits near the Louisiana border have drawn the attention of energy producers. At least three strip mines are currently producing lignite for electric power generation through burning.

Uranium was accidentally discovered in Texas in the mid 1950's. Since that time, a number of deposits have been discovered. These discoveries have been concentrated in an area along the Gulf Coastal Plain of approximately 300 miles. By 1974, a uranium ore producing mill was operating and a uranium extraction plant was under construction. This uranium will be leached in place from underground deposits and brought to the surface through wells.

The extensive energy resource development in Texas is accompanied by environmental concerns. Adding to their concerns will be the establishment of a number of fuels related projects scheduled for the state. According to the Bureau of Mines circular #8719, Projects to Expand Fuel Sources in Western States, May, 1976, the following projects have been proposed for Texas: six coal mines, 26 electric power plants, one coal conversion plant, 11 uranium mines, seven oil refineries, and six natural gas processing plants. Three of the power plants, which are proposed, will be predicated on nuclear technologies, thus utilizing nuclear sources of fuel. The coal conversion plant which is proposed is a pilot project which will employ Soviet in situ gasification technology. The Texas Utilities Service Co. of Dallas, has purchased the rights to be the sole licensing agent in the United States for this lignite gasification process.

These projects as well as accelerated awareness efforts, have increased environmental concerns on the part of the citizens. Energy development and environmental protection can be harmonious endeavors when planning is utilized.

B. Workforce Profile

The major state agency identified for purposes of this study is the Governor's Energy Advisory Council. The Council was created by executive order in 1974. With the enactment of the Energy Policy Planning Act in 1975, the Council became a state agency.

The major purpose of the Governor's Energy Advisory Council is to formulate state energy policy. Other areas of responsibility include:

- Develop and maintain an energy data base system;
- Encourage and promote energy development;
- Coordinate and promote all energy related research;
- Recommend legislation; and,
- Administer a public information system.

The following table details the current staffing levels of the Council. Information regarding current and projected workforce profiles was obtained through on-site and telephone interviews.

TABLE XL

STATE OF TEXAS

Governor's Energy Advisory Council Current (1976) Staffing Level

Position	1976	%/annum turnover * (average)
Executive Director	1	0%
Administrative Aide	1	0%
Division Director	2	0%
Program Personnel[1]	5	5%
Fuel Allocation Officer	2	3%
Librarian	1	0%
Program Personnel[2]	4	5%
Informational Personnel[3]	3	5%
Accountant	3	5%
Nuclear Power Specialist	1	0%
Lignite Coal Specialist	1	0%
Econometric Modeling Specialist	1	0%
Conservation Officer	1	3%
Solar & Wind Technologist	1	0%
Legal & Regulatory Personnel	2	3%
Computer Programmer	1	4%
Legislative Liaison	1	0%
Planner	1	0%
Secretarial	7	N/A
TOTAL	39	N/A

[1] Energy Information Program: Editors, Information Specialists

[2] Monitoring & Reporting Policy

[3] Energy Awareness

* estimated

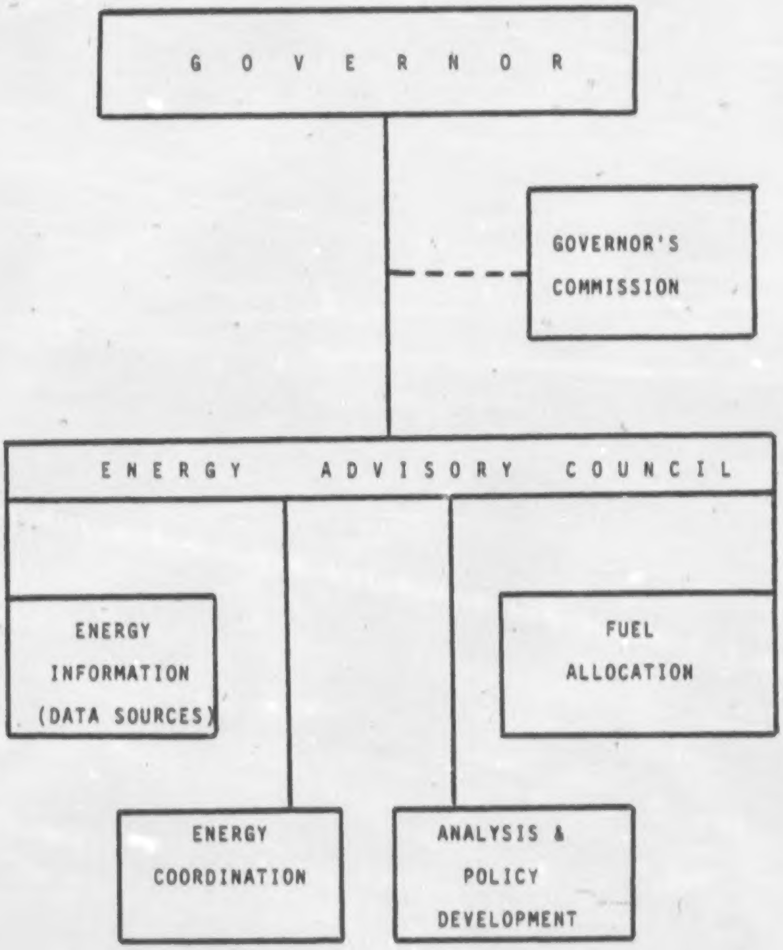
In addition, the Governor's Commission consists of:

- the Governor;
- the Lieutenant Governor;
- the next 8 highest ranking state officials.

STATE OF TEXAS

GOVERNOR'S ENERGY ADVISORY COUNCIL

Figure 22 ORGANIZATIONAL CHART


GOVERNOR
GOVERNOR'S COMMISSION
ENERGY ADVISORY COUNCIL
ENERGY INFORMATION (DATA SOURCES)
FUEL ALLOCATION
ENERGY COORDINATION
ANALYSIS & POLICY DEVELOPMENT

No firm figures are available at present regarding the total number of personnel statewide.

C. Workforce Projections

The legislature must pass on all increases in staff for the Energy Advisory Council. At the present time, the staff is considered to be adequate and no increases or decreases are anticipated.

While workforce projections for the private sector are highly tentative, sources in the field indicate that significant growth may occur in areas involving conservation expertise. Other areas of specialization will also experience growth. Estimates indicate that a four percent per annum growth rate in the private sector may be anticipated.

D. Training and Certification

The Governor's Energy Advisory Council has decreased training efforts over the last year. Seminars are now conducted, for the most part, upon request. The Council is also quite active in preparing reports and public information materials. Seminars are conducted for citizens at large as well as specific societal representative groupings such as business, industry and education.

The development of energy policy components is an ongoing activity of the Council. Recently the Council prepared energy policy statements for public review. Areas under consideration included: energy conservation in buildings, public information programs, energy conservation in government, and industrial energy efficiency.

Training is available through the state's universities and colleges for Council personnel. Specifically, upgrade and post graduate courses are available in the sciences and engineering areas. At present, there is no certification relative to this program.

E. Career Potential

Career opportunities should be available in specialized energy fields such as solar, wind and geothermal. But the majority of the occupations which should be available to 1982 include oil and gas expertise as well as conservation specialization.

As oil and gas reserves are depleted, Texas will experience economic hardships which will impact the job market. Conservation is becoming an area of increasing concern in Texas. Occupations aligned with the conservation field will experience increased availability over the next few years.

F. Conclusion

There are several areas of concern which have been expressed by state personnel. For example, three cities in Texas currently maintain the highest utility costs in the nation. These cities are Austin, the capital, San Antonio and Brownsville.

Texas is not only the largest producer of natural gas, but the nation's number one consumer. In the Houston area, the petrochemical industry utilizes vast quantities of natural gas. Certain products may not be produced without natural gas. Availability of supply, therefore, becomes an area of critical concern to the state. The agricultural industry is affected by availability of supply, and increasing costs of natural gas. Irrigation pumps are powered by natural gas and increased costs are beginning to be manifested in the decline of agricultural activities.

Of parallel interest to energy issues are land use management and coastal zone management. Although, traditionally, the management of the Texas land mass was guarded sacredly as an individual's right; too many factors contribute to the increasing need for some governmental restrictions. Interference from federal and/or state government is viewed with great alarm on the part of westerners. However, aside from the more common components of land use planning such as subdivision control and urban zoning ordinances, there are other areas of interest which have become integral parts of the issue.

Strip mining has been accomplished across the state, and, is today, ongoing. Texas ranks sixth among the states in acreage given over to strip mining activities. Uranium and lignite are extracted in this way. But, the most extensive examples in Texas involve sand and gravel. Lignite, as well as uranium, surface mining activities will accelerate in the state. Texas currently has no strip mining legislation. This is an area open to divergent opinions due to the involvement of governmental controls.

Power plant siting has become an increased concern of Texans. More consideration is being directed to the building of nuclear plants. But, the land requirements for these plants are extensive. Aside from the controversy over risks involved in nuclear plants as future sources of power, indepth planning regarding the use of Texas lands must be accorded this issue.

The most critical area in Texas regarding utilization of land is the Gulf Coastal Zone. This area is illustrative of environmental problems relative to urban sprawl, industrial expansion and uncontrolled growth. But offshore problems in this are becoming evident. Texas is seriously considering the development of a superport which is a deep-water port constructed for the specific accommodation of over-sized oil tankers. With concern for the continuation of the petrochemical industry, Texas is considering such an undertaking. New Jersey and Delaware have both declined the construction of such a facility.

In July, 1976, the federal Coastal Zone Management Act (CZMA) was amended. This Act affirms growing national concern over management of the nation's coastal areas.

Texas has developed a coastal management program which is currently being prepared for submission to the legislature. Upon approval, the Texas program will be presented for federal approval.

Under the new Section 308 of the CZMA a coastal energy impact assistance program has been established. This program consists of annual formula grants, (which the federal government pays the entire amount) to coastal states such as Texas based upon specific outer continental shelf energy activity criteria. Planning grants may be obtained to study environmental consequences resulting from new and/or expanded energy facilities. These are illustrative of prospects facing Texas upon legislative approval of the state's coastal management program.

With the advent of nuclear power and increased mining and milling activities, the workforce profile to 1982 and beyond assumes new dimension. Career potentials will abound over the next five to ten years. Texas is an area in which new career options in the energy field may emerge.

Selected Post Secondary Institutions With Formal Environmental Energy Programs

Approximately 10% of the public and private post secondary educational institutions in Texas offer environmentally related courses and/or degree programs. Information was not as readily available regarding community or junior colleges in the state.

East Texas State University at Commerce offers Bachelor's and Master's degrees in Environmental Studies through the Department of Earth Sciences. Lamar University at Beaumont conducts several environmental/energy programs which offer a Bachelor of Science degree. These include Environmental Engineering, Environmental Science and Energy Resources Management.

The Stephen F. Austin University at Nacogdoches, Texas, through the School of Forestry currently makes available a Bachelor level degree program in Environmental Science. The University of Texas at Austin, Dallas and San Antonio does not currently maintain Bachelor level programs. Master's and Doctor's degrees are available in Environmental Science and Environmental Management.

Sam Houston State University at Huntsville currently offers a B.S., M.A., and M.Ed. in Environmental Science through the College of Sciences. The College of Applied Arts and Sciences offers a B.S., M.A., and M.Ed. also in Environmental Science but the emphasis is on agricultural education.

Texas A & M University at College Station presently conducts an environmental program which leads to a Bachelor of Science degree. This program is administered through the Department of Plant Sciences and is a Bio-environmental Sciences curriculum.

Of the 36 private senior colleges and universities in Texas, four have been identified as currently maintaining environmental/energy related programs. William Marsh Rice University in Houston maintains a Department of Environmental Science and Engineering. The Department presently conducts programs in environmental science and engineering which lead to the following degrees: B.A., B.S., M.E.S.E., M.S., and Ph.D.

Southern Methodist University located in Dallas does not conduct environmental/energy education at the Bachelor level. The Department of Mechanical Engineering offers post baccalaureate degrees in environmental engineering which include the M.S. and the Ph.D.

A private university which offers a Bachelor of Arts degree in Environmental Studies is St. Edward's University at Austin. This B.A. degree is available through the Division of Physical and Biological Sciences. Post graduate degrees are not available in this field at present at St. Edward's.

Baylor University at Waco is the fourth private institution which currently conducts environmental/energy related programs. Through an interdepartmental program at B.A. or B.S. degree may be earned in Environmental Studies. At present, post graduate environmental offerings are not available.

In the following pages several post secondary programs are reviewed in more detail. These programs are representative of the offerings presently available in Texas and are not an exhaustive listing. Information was gathered by means of telephone interviews and catalogue review.

Sam Houston State University
Huntsville, Texas

Program: Environmental Science (B.S.)

Hours required for major: Semester - Major - 128, Minor - 21
Program Inception: 1970
Staff Size: Two full professors and one associate professor (all Ph.D.)
Enrollment: 35
Graduates (1976): 12
Placement: 9
Graduate Work: 3

Courses

Environmental Science
Legal Aspects of Pollution Control
Instrumentation
Water Supply and Wastewater Disposal
Air Pollution
English
Chemistry
Mathematics
Biology
Geoscience
History
Physics
Government
Economics

Baylor University
Waco, Texas

Program: Environmental Studies (B.A., B.S.)

Hours required for major: Semester - Major - 20, Minor - 18
Program Inception: 1970
Staff Size: One full-time professor (Ph.D.) and 30 part-time professors and instructors from other diciplines
Enrollment: 45
Graduates (1976): 4-5
Placement: Not available
Graduate Work: 4-5

Courses

An Introduction to Environmental Studies
An Introduction to Environmental Analysis
The Environment and Pollution
The Environment and Political Processes
Seminar in Environmental Studies
The Environment and Economic Analysis
Mathematical Techniques in Environmental Studies
The Environment and Energy
Natural Landscape Evaluation and Planning
Environmental Ethics
Problems
Special Topics in Environmental Analysis

State Legislation

TEXAS AIR

TITLE:

Texas Clean Air Act
Texas Civil Statutes 4477-5

PURPOSE:

To safeguard air resources of the state from pollution by controlling or abating air pollution and emission of contaminants, consistent with the protection of public health and welfare.

DEFINITIONS:

1. Air contaminant
2. Source
3. Air pollution
4. Board
5. Executive director
6. Person
7. Local government
8. New Source
9. Modification

ADMINISTERING AUTHORITY:

Air Control Board

AUTHORIZATIONS:

To establish ambient air quality standards;
To develop a state air control plan;
To enter and inspect property for enforcement of air standards;
To issue regulations pursuant to the act regarding open burning, auto emissions, sampling, and monitoring;
To designate air quality control regions;
To issue construction and operation permits for potential new sources of air pollution.

PROHIBITED ACTS:

To cause, allow or permit air pollution in violation of standards;
To construct or operate without proper permit.

EXEMPTIONS:

No regulation of solely in-plant or industrial working conditions.

PENALTIES:

Fines of from $50 to $1,000.

TEXAS PESTICIDES

TITLE:

Texas Pesticide Control Act
Texas Civil Statutes 135b-5

PURPOSE:

To provide for the regulation of labeling, distribution, transportation, use, disposal and registration of pesticides; for the certification of pesticide applicators; and to control pesticides generally.

DEFINITIONS:

1. Active ingredient
2. Adulterated
3. Animal
4. Antidote
5. Certified applicator
6. Commercial applicator
7. Commissioner
8. Competent
9. Defoliant
10. Desiccant
11. Device
12. Direct supervision
13. Distribute
14. Due notice
15. Environment
16. Equipment
17. Fungus
18. Inert ingredient
19. Ingredient statement
20. Insect
21. Label
22. Labeling
23. Land
24. License use category
25. Nematode
26. Noncommercial application
27. Person
28. Pest
29. Pesticide
30. Pesticide dealer
31. Plant regulator
32. Private applicator
33. Registered applicator
34. Regulatory agency
35. Restricted-use pesticide
36. State-limited-use pesticide
37. Unreasonable adverse effects on environment
38. Weed

ADMINISTERING AUTHORITY:

Department of Agriculture
Pesticide Advisory Committee

AUTHORIZATIONS:

To require the registration of all pesticides;
To issue experimental use permits;
To issue dealer licenses to pesticide dealers;
To issue regulations pursuant to the act, particularly regarding labels, pesticide classification, and testing;
To enter and inspect property in enforcement of the act;
To issue stop-sale orders;
To certify commercial and non-commercial pesticide applicators;
To register commercial application equipment.

CERTIFICATION OR LICENSING:

All applicators must be certified; certified applicators may be licensed as to category if funding allows.

PROHIBITED ACTS:

To sell or distribute non-registered pesticides;
To sell restricted pesticides without dealer license;
To detach, alter or destroy pesticide labels;
To use restricted or state-limited pesticides without certification;
To store or dispose of pesticides in violation of rules;
To violate the terms of a pesticide license or certificate.

EXEMPTIONS:

Persons regulated by the Structural Pest Control Act; Private applicators, public officials, transporters under certain conditions, pesticides for export only.

PENALTIES:

Violations are a misdemeanor.

TEXAS POTABLE WATER

TITLE:

Texas Sanitation and Health Protection Law (in part)
Texas Civil Statutes 4477-1

PURPOSE:

To provide for maintenance of sanitary conditions and protection of public drinking water supplies.

DEFINITIONS:

1. Common drinking cup
2. Drinking water
3. Public health engineer
4. Sanitarian
5. Sanitary
6. Sewerage plant operator
7. Water plant operator
8. Water supply

ADMINISTERING AUTHORITY:

State Department of Health

AUTHORIZATIONS:

To establish drinking water quality standards;
To certify waterworks operators;
To approve all waterworks and sewage disposal systems;
To approve all public water systems as to quality;
To certify sewerage treatment plant operators.

CERTIFICATION OR LICENSING:

All operators of waterworks systems and sewerage treatment plants must be properly certified.

PROHIBITED ACTS:

To use common drinking cup or other unsanitary items;
To furnish public water not under supervision of a certified operator;
To connect physically public with non-public water system;
To operate a sewerage disposal system not under supervision of a certified operator.

EXEMPTIONS:

Distribution of raw, untreated surface water;
Septic tank and subsoil treatments.

PENALTIES:

Fines of from $10 to $200.

TEXAS RADIATION

TITLE:

Radiation Control Act
Texas Civil Code 71-4590f

PURPOSE:

To provide for a program of effective control of radiation sources in the protection of the occupational and public health and safety.

DEFINITIONS:

1. By-product material
2. Radiation
3. License - general and specific
4. Person
5. Source materials
6. Special nuclear material
7. Registration
8. Excessive exposure
9. Radioactive material
10. Source of radiation
11. Electronic product

ADMINISTERING AUTHORITY:

State Department of Health
Radiation Control Agency
Radiation Advisory Board

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To evaluate radiation hazards;
To coordinate radiation programs with other state agencies;
To act as the state lead agency in radiation matters;
To license radioactive materials;
To register all sources of radiation;
To require records of radiation sources;
To impound radiation sources in emergencies.

PROHIBITED ACTS:

To use, manufacture, produce, transport, own, or possess any licensed or unregistered radiation source.

EXEMPTIONS:

May be granted by regulation.

PENALTIES:

First offense - fines of from $50 to $200;
Subsequent offenses - fines of up to $1,000 or one year imprisonment.

NRC AGREEMENT STATE: Yes

TEXAS SOLID WASTE

TITLE:

County Solid Waste Control Act
Texas Civil Statutes 4477-8

PURPOSE:

To authorize a cooperative effort by counties, local agencies, and others for the safe and economical collection, transportation, and disposal of solid wastes in order to control pollution.

DEFINITIONS:

1. Act
2. Person
3. District
4. City
5. Public agency
6. County
7. Solid waste disposal system
8. Solid waste

ADMINISTERING AUTHORITY:

Counties of the State

AUTHORIZATIONS:

To acquire, construct and operate solid waste disposal systems;
To regulate disposal systems including the prohibition of some disposals;
To contract with public agencies for solid waste disposal services;
To issue bonds to carry out the act.

TEXAS SOLID WASTE

TITLE:

Solid Waste Disposal Act
Texas Civil Statutes 4477-7

PURPOSE:

To safeguard the health, welfare, and physical property of the people through controlling the collection, handling, storage, and disposal of solid wastes.

DEFINITIONS:

1. Person
2. Department
3. Board
4. Local government
5. Solid waste
6. Municipal solid waste
7. Industrial solid waste
8. Garbage
9. Rubbish
10. Sanitary landfill
11. Incineration
12. Composting
13. Person affected

ADMINISTERING AUTHORITY:

State Department of Health
Water Quality Board

AUTHORIZATIONS:

To develop state municipal and state industrial solid waste plans;
To issue regulations pursuant to the act, setting standards and controlling solid waste;
To approve solid waste disposal sites;
To issue permits regarding the authorization and maintenance of solid waste sites;

AUTHORIZATIONS (Cont'd):

To provide solid waste assistance to other state and local agencies;
To enter and inspect property to enforce the act.

COUNTY POWERS:

Appropriate funds for solid waste sites, develop plans, issue licenses, enforce act locally, and enter cooperative agreements.

COUNTY PROHIBITIONS:

Issue or renew licenses without state approval; control particular mining, manufacturing or industrial waste.

PROHIBITED ACTS:

To collect or dispose of solid waste in violation of act, permit, license or regulation.

PENALTIES:

Fine of from $50 to $1,000 per day per violation.

TEXAS WASTE WATER

TITLE:

Disposal Well Act
Texas Water Code, Chapter 22

PURPOSE:

To provide for the control of water pollution through regulation of disposal wells in the state.

DEFINITIONS:

1. Board
2. Commission
3. Pollution
4. Industrial and municipal waste
5. Oil and gas waste
6. Fresh water
7. Casing
8. Disposal well

ADMINISTERING AUTHORITY:

Water Quality Board

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To issue permits for drilling of or conversion to disposal wells, regarding industrial/municipal waste or gas/oil waste.

CERTIFICATION OR LICENSING:

Permits will be issued if disposal well: in public interest, violates no rights, and water will not be polluted.

PROHIBITED ACTS:

To drill or use disposal well without permit.

PENALTIES:

Fines of up to $1,000.

TEXAS WASTE WATER

TITLE:

Oil and Hazardous Substances Spill Prevention and Control Act
Texas Water Code 21.801

PURPOSE:

To prevent the spill or discharge of oil and other hazardous substances into coastal waters of the state, and to provide for removal of such discharges.

DEFINITIONS:

1. Board
2. Coastal land or water
3. Coastal area
4. Discharge or spill
5. Fund
6. Harmful quantity
7. Hazardous substance
8. Oil
9. Person

ADMINISTERING AUTHORITY:

Texas Water Quality Board

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To prepare discharge reports;
To coordinate discharge cleanup activities with other state agencies;
To generally enforce the act.

PROHIBITED ACTS:

To fail to remove and abate oil and other discharges;
To falsify records or reports regarding discharges or cleanups;
To violate any other provision of the act.

EXEMPTIONS:

Act of war, government, God or third party.

PENALTIES:

General violation - fines of from $50 to $100;
Failure to report - Class A misdemeanor;
Falsification violation - third degree felony.

TEXAS WASTE WATER

TITLE:

Texas Water Quality Act
Texas Water Code, Chapter 21

PURPOSE:

To maintain water quality in the state consistent with public health and enjoyment; to promote the development of regional waste collection, treatment, and disposal systems.

DEFINITIONS:

1. Board
2. Executive director
3. Water/water in the state
4. Waste
5. Sewage
6. Municipal waste
7. Recreational waste
8. Agricultural waste
9. Industrial waste
10. Other waste
11. Pollution
12. Sewer system
13. Treatment facility
14. Disposal system
15. Local government
16. Permit
17. To discharge

ADMINISTERING AUTHORITY:

Water Quality Board

AUTHORIZATIONS:

To enforce the act and establish water quality standards;
To develop comprehensive water plan;
To enter and inspect property in enforcement of the act;
To enforce a permit discharge system;
To approve local water quality management plans;
To control pollution from private sewage facilities;
To issue regulations pursuant to the act.

CERTIFICATION OR LICENSING:

Permits are issued to sources to allow pollutant discharge as specified in permit.

PROHIBITED ACTS:

To allow any discharge into water without permit;
For local governments to fail to develop water pollution control plans.

PENALTIES:

Civil penalty - fines of from $50 to $1,000;
Criminal penalty - a misdemeanor.